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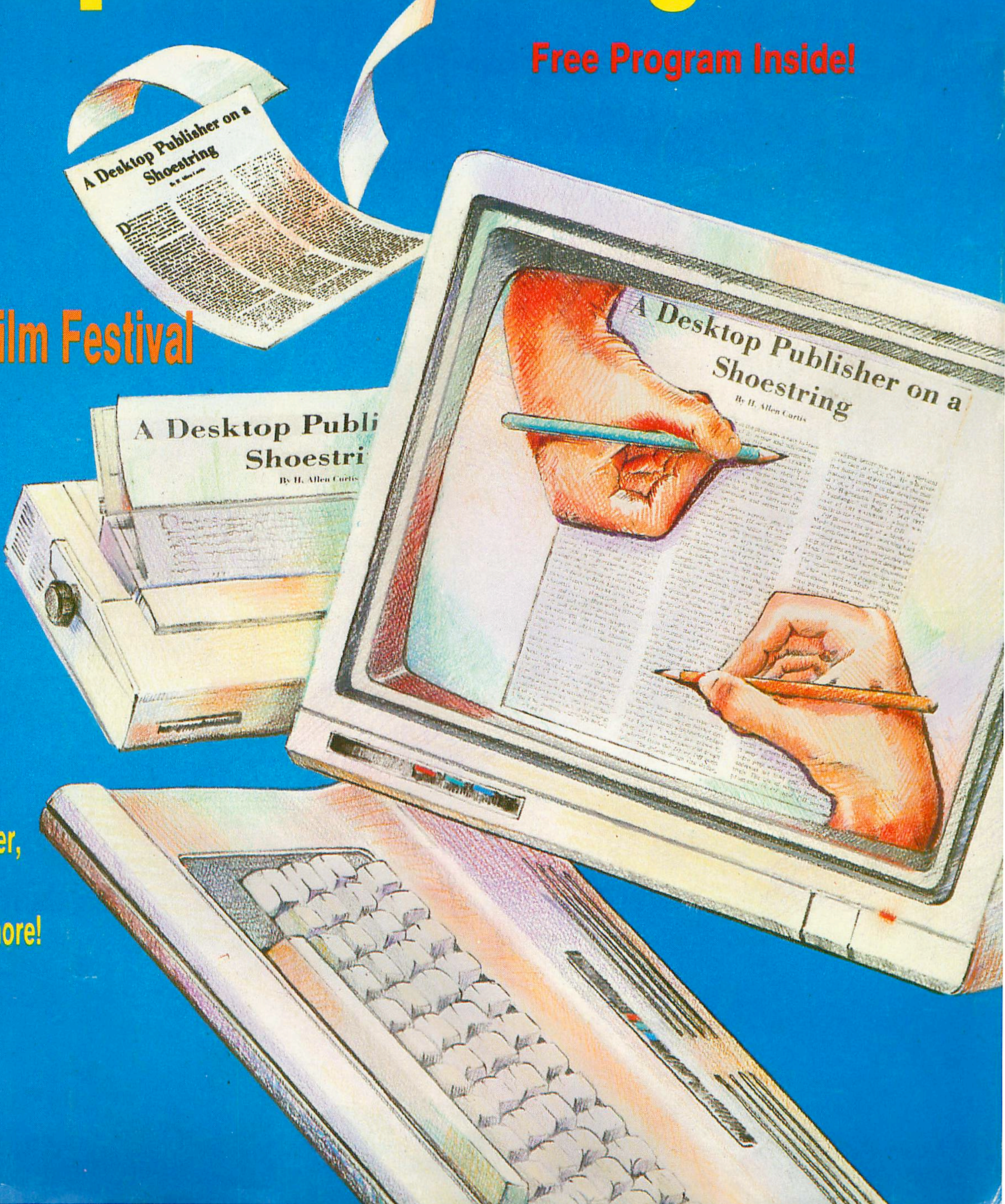
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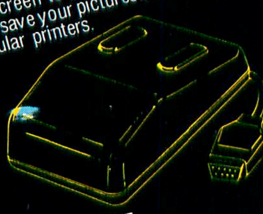

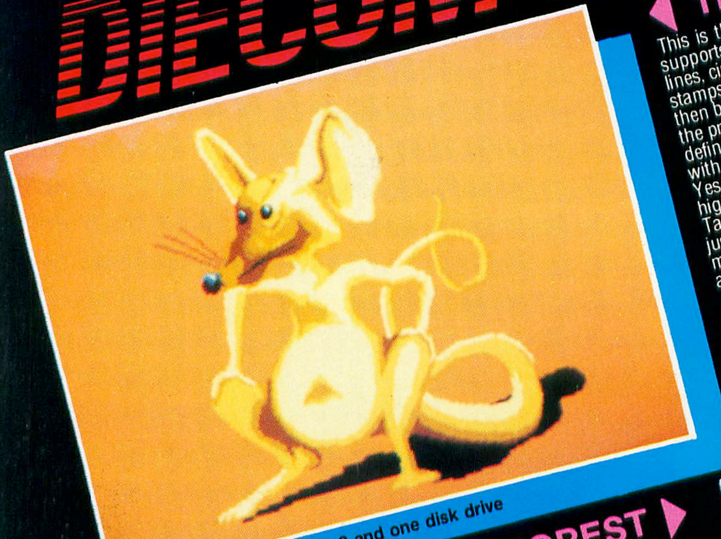

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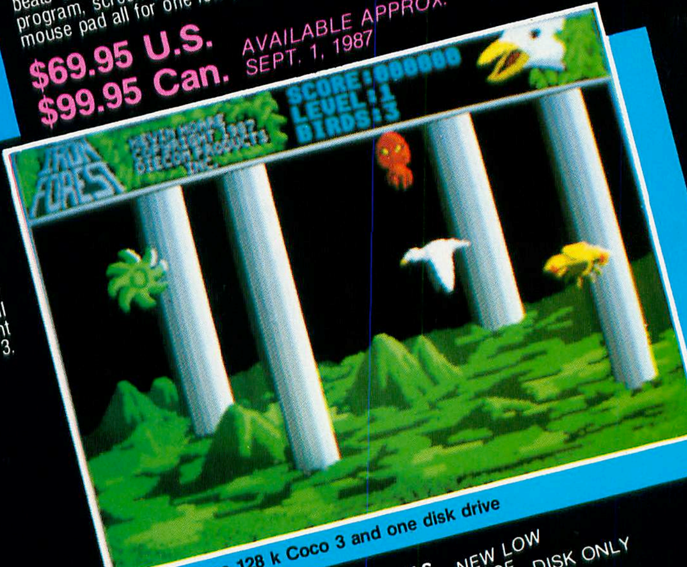

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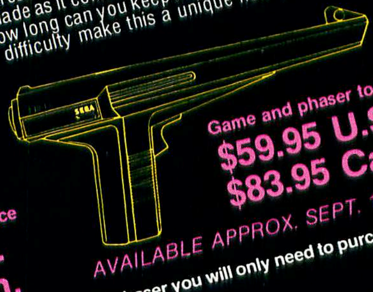

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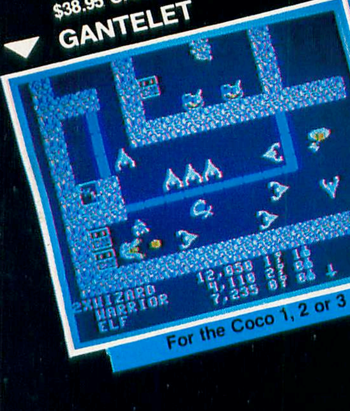

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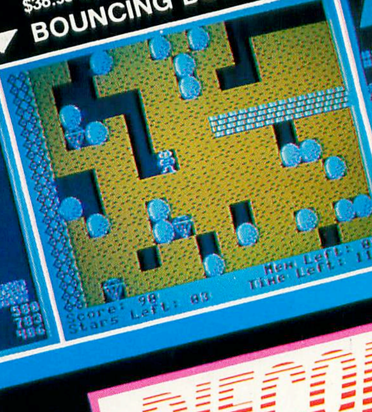

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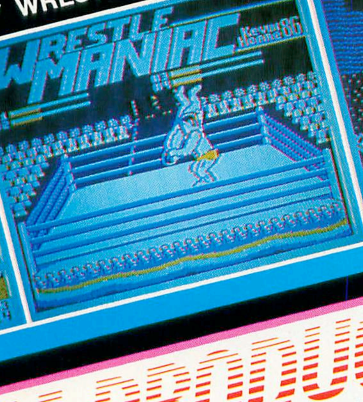

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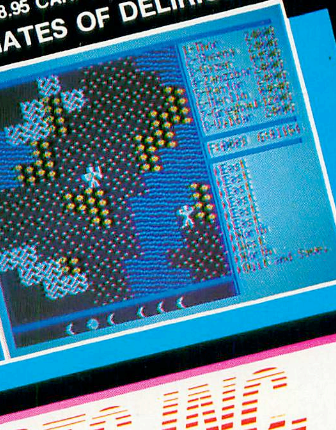

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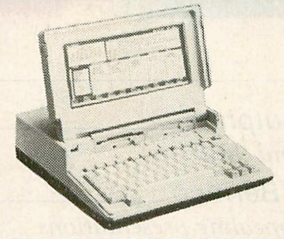

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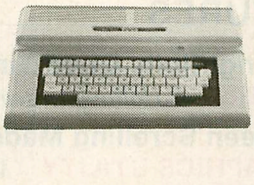

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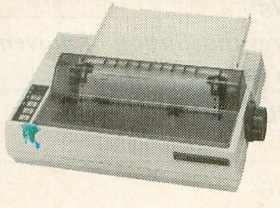

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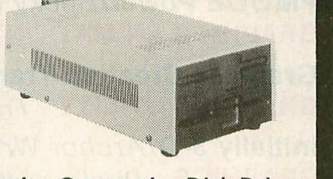

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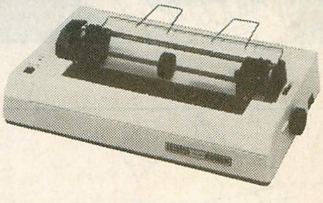

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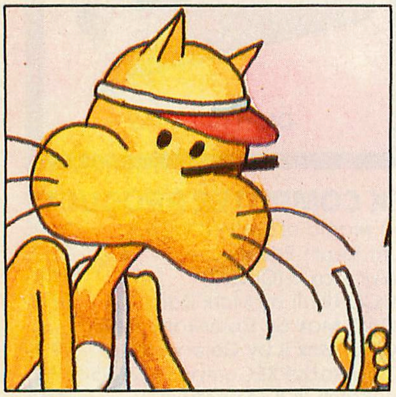
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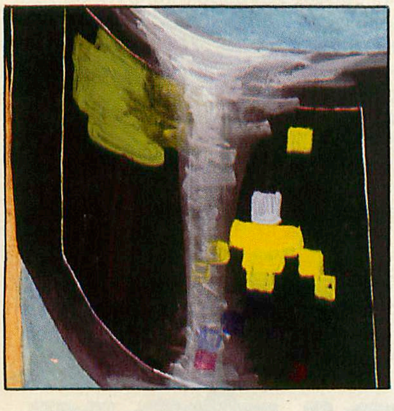
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NEXT MONTH: Reach out and touch someone — get online — make contact! We make it easy with our November Telecommunications issue. There's a whole world out there for you to discover, and THE RAINBOW is ready with the answers to your communications questions. Look for information services and much more. Plus a wide selection of games, utilities, Q-and-A columns, helpful programs, hints, tips and lots more all for the CoCo.

Call on us — THE RAINBOW — for all your Color Computer 1, 2 and 3 needs!

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The RAINBOW
October 1987 Vol. VII No. 3

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Letters to the RAINBOW

CoCo Party Plan

Editor:

While I am grateful for the continued support of frankly frustrated publishers, programmers and software vendors in the wide world of CoCo, I am somewhat dismayed at the vitriol used against program pirates. I feel this subject needs less vitriol and more ideas, and I have a few to shell out.

We all know that software piracy is destructive to the CoCo Community and discourages promising programmers, but I don't feel that the situation is as bad as many have led us to believe. After all, true software "crackers" are relatively few, and the pirate programs of yesteryear don't work on the new CoCo 3. Your magazine and others in the community should not advertise pirate programs as a matter of policy, and the professional software manufacturers should avoid making them, of course.

Further, a different marketing strategy should be used: there are many companies now that use parties and clubs as a medium of sales — Tupperware and Avon to name a few. Why not CoCo? I have quite a grudge against Tandy, and the general move in the direction of selling programs via Radio Shack stores is repugnant to me because Tandy personnel don't generally know enough about their own wares, much less CoCo wares. I don't suggest sending out programs and hardware willy-nilly to every club around, but I *do* suggest full-time salesmen using the medium of CoCo clubs to sell their wares. Salesmen could even support these clubs with regular freeware in return for showing off their wares, perhaps tying freeware grants to sales through the club, offering discounts for sizable sales and other aids to boost membership.

I feel that much software theft is a result of attempts to bring people together. The theft of software is too widespread simply to be the result of a rise in the crime rate of users. Powerful psychological factors are at work: the need to "belong" to a group and to bring something sensational to it (newcomers may feel this especially), the desire to bring others to your own level, the desire to obtain something of proven value instead of a pig in a poke, the desire to see how something works, the desire to outsmart a pro. All these desires are present, and many more besides. Direct sales through clubs would eliminate several of these motives, especially that of buying something strictly on the basis of advertising reputation.

This is not the answer to all our needs, but it provides an answer to several problems; and similar innovations will do so, too. Piracy is currently easy, and that ease is something that CoCo enthusiasts will have to be weaned from with constant, diligent reminders and innovation.

Thank you for the forum.

Mike Brant
Martinez, CA

SIGs International

Editor:

Since the first computer clubs were established, the number of members has grown to several million. There is a need for an international organization of computer clubs that can help all the clubs, organize meetings, publish its own journal and so on.

The difficulty is that the millions of computer users do not form an integral whole. At the best, clubs are joined together in a partnership in the same country only. The reason they can't form connections with clubs in foreign countries is rather simple: partners are unknown to each other.

To overcome on this difficulty, NJSZT is ready and willing to give a helping hand as an agent.

NJSZT has called into action several computer clubs in Hungary. If you're interested please send a letter with the following information to NJSZT, P.O. Box 240, H-1368, Budapest, Hungary.

Include the club's name, address, telephone number; leader's name, address, telephone number; types of computers used by the members in the club; names of sections (if any); number of members; frequency of the meetings; the goal of the meetings; partnerships (if any).

Also, please tell us what you think is required of an international organization.

M. Havass
General Secretary
Budapest, Hungary

CoCo on Ice in Holland

Editor:

Sadly, I have to report that the last CoCos seem to have disappeared from Tandy outlets here in The Netherlands. The word is that the CoCo 3 will not be available here. I assume that will also be the case in other countries on the 220/240 volt and PAL television systems.

When my trusty old gray CoCo 1.1 eventually gives up the ghost, will this mean farewell CoCo and farewell RAINBOW? Let's hear from CoCo fans in Australia, Western Europe and elsewhere.

Keiran Kenny
The Hague, Holland

BACK TALK

Editor:

The August issue of RAINBOW contained a letter from a D.J. Leffler under the title "Bit-Banger Rebuttal." This letter needs a little clarification since it contained a few incomplete statements.

Mr. Leffler says his CoCo's serial port (the "bit-banger") can operate at baud rates up to 4800 "in duplex," but he failed to mention whether it is operating in half or full duplex. From the application he mentioned (two CoCos in a master-coprocessor configuration), I believe he meant half duplex since full duplex would not be necessary in his dedicated application. In any event, very few CoCo owners would apply their computer in this manner. Most prefer to purchase a modem and get online with Delphi or their local BBSs.

It is quite true that CoCos can achieve transfer speeds of 9600 bits per second in half duplex mode, and many CoCo owners routinely operate their printers at 9600 bits per second through the serial port. Half duplex operation, of course, requires data transmission in only one direction at a time.

However, in full duplex mode, one must be able to send and receive data at the same time. While full duplex operation through the serial port may appear to be successful, a continuous incoming stream of data will cause the terminal software to drop either incoming or outgoing characters, or possibly both. Additionally, some "garbling" will appear from time to time as the terminal software attempts to maintain synchronization with both the incoming and outgoing bit streams. This situation is unavoidable, even if one takes unusual care in the design of the time delay loops.

Conversely, full duplex operation at 1200

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Richardson, Texas 75080
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bits per second is quite possible through the CoCo 3's bit-banger port. The popular terminal programs *Rickeyterm* and *GeTerm* support such operations quite well. This is primarily due to hardware differences incorporated in the design of the CoCo 3.

On the CoCo 3, the programmable interrupt timer can be used to provide a stable time base from which the terminal software may sample the incoming bit stream and send the outgoing bit stream very reliably. This allows for the creation of a software UART, and unlike the situation in the CoCo 1 and 2, it allows more precise timing. Since it's a hardware device, fewer actual interrupts occur, which means a noticeably larger amount of processor time is available. In actual practice, baud rates higher than 2400 are still rather hard to do using the bit-banger on the CoCo 3 in full duplex mode. Both *GeTerm* and *Rickeyterm* will function at 2400 bits per second in full duplex mode.

So, you see, even if using a well-designed modem and appropriate terminal software, the integrity of data communications may be jeopardized because of the unreliability of the CoCo's PIA-driven serial port. A hardware-based serial port, such as the Deluxe RS-232 Program Pak, is the way to go.

Don Hutchison
Atlanta, GA

Obsoletion Scare

Editor:

I am very angry that you have switched most of your programs so that they only work on the new CoCo 3! I, who have had the original CoCo for several years, am not happy that half of your programs can't be run on my computer! I am sure I am not alone. Reading the August 1987 issue of RAINBOW, I was disappointed when I saw that the game *Danger Zone* was only for the CoCo 3. I would like to know the reason for this switch.

Jason Max
Phoenix, AZ

The August 1987 issue presented 17 programs for the CoCo 1 and 2 and four for the CoCo 3. We will continue to support the CoCo 1 and 2 users. However, we must also support the newer CoCo 3! Yes, some programs will only run on the CoCo 3, but that is because the enhancements in the machine allow such programs to be written. The earlier CoCos can't run these programs because they don't have these enhancements.

HINTS AND TIPS

Editor:

I'd like to share a simple little program for making a blue and red checkerboard design on your computer. If you change the `SCREEN` value in Line 3 to `SCREEN 1,0`, you'll get green and blue on a green background. If you change the step rate at the end of Line 3, you'll see many different patterns emerge. Enjoy!

```
1 PMODE4,1:PCLS1
2 SCREEN1,1:COLOR0,1
3 FOR Z=0 to 247 STEP 1.93
4 LINE (Z,0)-(Z+9,191), PSET
5 NEXT Z:EXEC44539:GOTO 1
```

Bill Bernico
Sheboygan, WI

CoCo in the Key of 3

Editor:

In using Joseph Platt's program *Music+TR* from June 1987, I discovered a way to combine several keys of music into the same song.

You must place the first half of the song in the desired key on disk, then copy the second half to begin at the end address of Part One, plus one. Transpose Part Two then load Part One back from the disk. Part One will load over Part Two, zeroing only the first two notes of Part Two. By replacing these you will have a key change within the same song.

Jim Hillhouse
Live Oak, FL

The BASIC Solution

Editor:

I have read that in order to benefit from the 80 columns available on the CoCo 3 you must use the RGB monitor.

While it's true that a color composite monitor is less than ideal for the 80-column format, such is not the case with a monochrome. While awaiting the availability of the CoCo 3, I dug out my Amdek 300 green screen, which had been packed away since I got a new color monitor. Every night I had visions of a nice 80-column display on that lovely green screen. When the big day came I was very disappointed at the first results.

On power-up, the default values give you black characters on a green background in all three text formats. A monochrome monitor displaying this combination produces undesirable vertical bars in 32- and 40-column format and makes 80 columns unreadable. However, as in most cases with the CoCo, problems are usually greatly outnumbered by solutions. On the CoCo 3, the solutions are built into BASIC. Within 10 minutes of that first disappointment, I had found my favorite combination of bright letters on a black background using `PALETTE 2,0` and `ATTR 3,2`. I feel this combination on a green screen monitor is unbeatable. On my black-and-white monitor I prefer dark characters on a light background. Using `ATTR 6,4`, this, too, is a snap. Both the 13-inch green and the 9-inch black-and-white display beautifully sharp and crisp characters in 80 columns.

Mikey Kaylor
Cleveland, TN

REQUEST HOTLINE

Editor:

I am interested in finding a genealogy program for the CoCo 2. If you have or know of any program available please write.

Myke Mortensen
4734 East 17 Street
Tucson, AZ 85711

Big Blue CoCo?

Editor:

I would like to ask all of the hardware buffs out there if they have plans for either of the following. I would like to see an accelerator card for the CoCo 3. How about a card to let the CoCo 3 be IBM-compatible? We've got all the right specs (memory, graphics, drive format, etc.). The market would be immense for such products.

Eric A. Wolf
South Bend, IN

INFORMATION PLEASE

Editor:

I own a Model 101 Metric Industries Interface for my printer, a Legend 880. I bought the interface on sale from a private owner. The owner said no instructions for the interface came in the box when he bought it. If someone has instructions for the Model 101, I would appreciate it.

Concerning my Legend 880 printer, I would like to find anyone who has one and can share their experience with it. I am trying to find compatible graphics and word processing software for it.

John C. Onken
113 South Alina
Roanoke, IL 61561

Picture This

Editor:

I wrote a program displaying a picture on the CoCo 3's 320-by-192 graphics screen. I would like to save it to MGE format so it can be loaded into *Color Max 3*.

Randy Lyman
2560 East Adobe
Mesa, AZ 85203

KUDOS

Editor:

Determined to learn how to access the CoCo 3's extra memory using assembly language, and after beating my brains out, making call after call and poring over the CoCo 3 articles in the RAINBOW, I finally called RAINBOW and talked to Cray Augsburg. He suggested I purchase a CoCo 3 service manual, because sometimes it explains technical information not supported elsewhere. I ordered one from my local Radio Shack for $15, and Cray was correct. This manual contains all the information needed to access the extra memory. As an added bonus it even tells how to access the `PALETTE` from assembly language. At $15 this is a very worthwhile investment. Thanks a lot to Cray Augsburg; my hat is off to you.

Arron W. Branigan
Jacksonville, AR

A KDSK Fan

Editor:

I recently downloaded *KDSK* by Ken Wuelzer after reading Richard White's enthusiastic review in the April 1987 issue. I totally agree with Mr. White that this is one of the best programs written for the CoCo. I rate it up there with my favorite program, *ADOS*, by Art Flexser. Art really outdid himself on this one. He has succeeded in taming the unruly CoCo 3 with his modified *RSDOS* program. For those users like myself who use a monochrome monitor, now you can boot up the CoCo 3 with a good monochrome picture without having to type in commands to make the display readable. Plus, there are numerous other "customized" subroutines you can create to make your CoCo easier to use by using single keystroke entries.

R.C. Buescher
Madison, WI

Telecommunication Inflation

Editor:

The Federal Communications Commission (FCC) has announced a proposal that calls for assessing additional connect charges of about $5 hourly for computer telecommunications services going through packet switching, value-added services such as Telenet and Tymnet, starting January 1, 1988. This will add at least $5 an hour cost to any service connected to packet switches such as CompuServe, Bix, Source, Delphi, Genie and People-Link, and will add an hourly charge to such services as the pending Tymnet's PC Express and Telenet's PC Pursuit (which charges $25 a month for non-prime time use of Telenet reaching local systems in the 25 largest cities in the U.S.).

Of course this will kill off such efforts by Tymnet and Telenet to offer mass-consumer, inter-city telecommunications at low rates, and will probably just about kill off individual subscribers (rather than corporations and government agencies) to national services like CompuServe, Source, Genie and BIX. It will also ensure that no public educational institution will get into these type services. The minimum non-prime time rates for any national service will exceed $10 an hour, and daytime rates will be above $25 an hour.

The new chairman of the FCC is Dennis Patrick. The other commissioners are James Quello, Mimi Dawson and Patricia Diaz Dennis (there is still an unfilled seat vacated by chairman emeritus Mark Fowler).

The FCC is accepting comments on the ruling. You can write to: Office of Opinion and Review, The Secretary, 1919 M Street, N.W., Room 222, Washington, D.C. 20554. Refer to "Interstate Access Charges Exemption for Enhanced Service Providers CC Docket 87-208."

Copies of this document are available by calling the FCC at (202) 632-7000, who will refer you to a transcript company called ITS at (202) 857-3800.

John Gordon Reid
Woodside, NY

In Response to Recurrent Inquiries . . .

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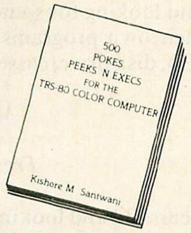
FOR THE TRS-80 COCO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Kishore M. Santwani

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Pen Pals

- I am 40 years old and am seeking pen pals who are licensed radio amateurs and shortwave listener hobbyists. I have a CoCo 2 and 3, an FD-500 SSDD drive, and a Legend 880-DMP.

John C. Onken
113 South Celina Street
Roanoke, IL 61561

- I am 10 years old and searching for pen pals around my age. I have a CoCo 2, a CoCo 3, disk drives and a printer.

Jeremy Radachowsky
P.O. Box 60
Bantam, CT 06750

- I am looking for pen pals seriously interested in BASIC programming. I have a CoCo 3, disk drive, printers and a Speech/Sound Pak.

Jim Cannon
526 Industry Road
Atwater, OH 44201

- I am interested in having a pen pal anywhere in the United States. I am 12 years old and have a 64K CoCo 2, multi-pack, disk drive, DMP-105 printer and a cassette recorder.

Mike O'Neal
437 Main Street
P.O. Box 233
West Townsend, MA 01474

- I'm 61 years old and retired. I have plenty of time to trade ideas. So, take a chance, and drop me a line. We could be friends for many years.

John Jenkins
7333 West 112th Place
Worth, IL 60482

- I am looking for pen pals in northern New York and eastern Vermont. I am 13 and have had my CoCo for four years. I also have a disk drive, CCR-81 cassette deck and a DMP-130 printer. I would especially like to correspond with any dungeons and dragons players.

David M. Endersbee
33 Scenic Pt. Drive
Jay, NY 12941

- I have three 64K CoCo 2s, six disk drives, cassettes, multi-pack, SG-10 printer, CGP-115 printer and a CGP-220 printer. I have just started a new club in my area and any advice will be appreciated. I will answer all who write.

Bobby Roger Queen
1737 Farmville Road
Shelby, NC 28150

- I have just moved to San Antonio, and I feel very much alone. I would like to get in touch with the CoCo Community of San Antonio. I have a CoCo 3 with two disk drives, a DMP-105 and a modem. I am an avid OS-9 hobbyist, too.

Todd Larsen
7371 Estrid Trail
San Antonio, TX 78244

- I am looking for a pen pal who enjoys Adventures and music programs. I have a CoCo 2, joysticks, mouse, disk drive, cassette recorder and I'm going to purchase a printer soon. I am a 16-year-old male.

Curtis Schaaf
RR 1, Box 186
Moro, IL 62067

- I have a CoCo 1 with two drives, cassette and a DMP-100 printer. The CoCo has 128K, but operates as a 64K machine. My interests are games, Adventures and utilities.

Richard Durr
7337 Brookview Circle
Tampa, FL 33614

- I am 12 years old and have a CoCo 2, DMP-105, modem and disk drive.

Eric Mathurin
1129 Soderlind
Ottawa, Ontario
Canada K2C 3B1

- I'm 28 years old and proud owner of two CoCo 2s. If there are any other "old fogies" out there (if you aren't 14 and brilliant, you can't *really* understand computers) who'd like to correspond with a merely-adequate-but-obsessive programmer, please write.

David B. Smith
4112 Trinity Road
Duluth, MN 55811

- I have a 64K CoCo 2, one FD-501 drive, a CCR-81 recorder, a DMP-105 printer and a DCM-3 modem. I would love to hear from anyone to talk about the glorious CoCo.

Andy Engle
2303 Highland Hill
St. Peters, MO 63376

- I would like only pen pals who are Doctor Who fans. All letters will be answered.

Chris Curtis
Route 1, Box 186
Walling, TN 38587

- I am a publisher of a fledgling newsletter for world-wide pen pal hobbyists. I do most of the writing myself, but there is a lot of reader participation. My "printing press" is none other than a 64K CoCo 2, a DMP-105 and *Color Scripsit*.

The best way to enjoy *La Pluma* is to read it, write to people who list themselves for pen pals and even list yourself. Have fun discussing computers, or anything else that you like. Anyone wishing to join *La Pluma Press* should write to me at P.O. Box 77, Crompond, NY 10517. People of all ages from any place are welcome.

Jacqueline D. Gannuscio
Editor/Publisher LLP

- I am 14 years old and looking for a pen pal who lives anywhere in the world. I own a CoCo 2, CoCo 3, FD-501 disk drive, DMP-130 and CCR-81 cassette. I love games and have just started working with OS-9 Level II.

Jason Ebbeling
Gulf Road
Berkshire, MA 01224

- I'm 10 years old and have a 64K CoCo 2, disk drive, cassette recorder and a DMP-105 printer. I'm a game nut — I like all games, especially arcade. I'm looking for Canadian pen pals of any age.

Jason Nielsen
1535 Winslow Drive
Sooke, British Columbia
Canada V0S 1N0

- I am 15 years old and own a CoCo 2 and 3, a CGP-220 printer and a CCR-81 cassette. I will soon own a disk drive and a CM-8 monitor.

I enjoy using my CoCo, drawing and reading, and would like to have a pen pal between 14 and 16 years of age. I would like someone with a creative mind who likes to write Adventure games.

Dana E. Sonnie
21 Chapel Street
Yalesville, CT 06492

- I'm 23 and looking for someone who likes to write their own programs and graphs. I have a CoCo, disk drive, cassette player, and a modem.

Maryann Exum
2987 S. Clara
Fresno, CA 93706

- I am 17 years old and looking for pen pals. My present system consists of a 64K CoCo 2, DMP-130 printer and cassette recorder. I will return all letters sent to me.

Eddie Mendonca
3000 Merlan Way
Hanford, CA 93230

- I am 10$^1/_3$ years old and have a CoCo 2 and some joysticks. Anyone wanting a pen pal, please write to me.

Armando Perea
824 N. Humbolt #4
San Mateo, CA 94401

- I am 17 years old and have a 64K with two disk drives and a multipack interface with many accessories. I would like to have a pen pal who is interested in exchanging ideas.

Marc Steinman
620 28th Ave. So.
Grand Forks, ND 58201

- I am 14 years old and am looking for a girl pen pal who lives on the East Coast and has a CoCo 2 or 3. I have everything you can attach to the CoCo, and then some. I also have a very good sense of humor.

Eric Humphreys
327 Snowden Lane
Princeton, NJ 08540

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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(See our Communications Extravaganza on Page 15!)

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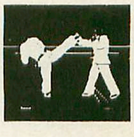

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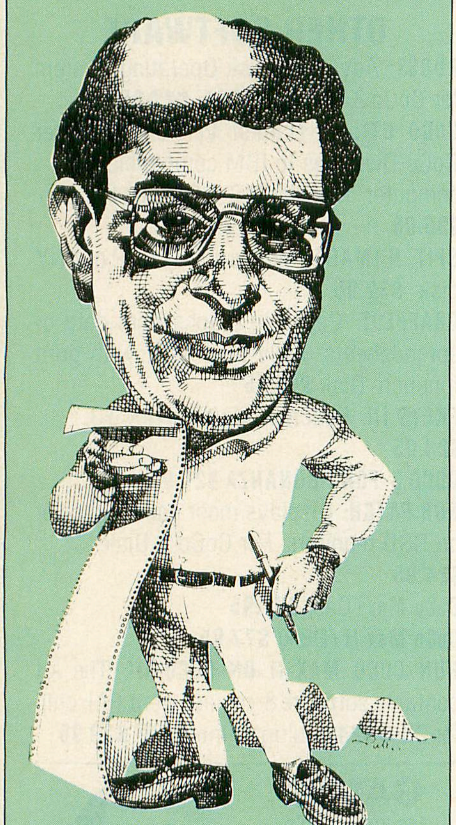

We're Doing OK

Probably the most common letter I get these days is from those readers who ask why THE RAINBOW has decreased its number of pages in the past year. I think it is a fair question, and one that needs to be answered.

The way we determine the number of pages that appear in the magazine is simply by the number of advertisements we have. We establish a ratio of advertising to editorial copy and try as much as we can to adhere to that. So, when the number of ads goes down — as it has been doing lately — then the number of total pages in the magazine goes down, too.

Of course, the inverse is also true. You will notice that this month's issue is larger, in terms of pages, than last month's issue. The reason is that we have more ads. By the way, pages are usually added in increments of 16, although we would like to be able to add 32 at a time. Why? Because the 32-page package is the most economical to run on a printing press.

Despite the fact that our editorial (and advertising) pages have been down in the last year or so, THE RAINBOW continues to be in good financial health. We have a wealth of subscribers, a good, stable advertising base, and we work hard to keep our costs down. This translates into sure knowledge that we will be a part of the CoCo Community for a long time to come.

I get most distressed when I see letters from readers who try to draw comparisons between some of the defunct Color Computer magazines in their last months of life and a decrease in the pages of THE RAINBOW. There are vast differences between the two situations. The main one is we have a strong subscriber base and sell well in the bookstores we allow to carry THE RAINBOW. Those late and lamented publications never had a strong subscriber base

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DISK LABEL MAKER: DMP Printers! #124
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ENHANCED KILL: #128
ENHANCED LLIST: Beautiful Listings! #129
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FAST SORT: 100 strings in 3 seconds!! #131
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GRADEBOOK: Great for teachers! #136
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GRAPHICS SCREEN DMP DUMP: #138
GRAPHICS SCREEN LARGE DMP DUMP: #139
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KEY CLICKER: Ensures inout accuracy. #144
KEY SAVER: Save/Recall your keystrokes. #145
LAST COMMAND REPEATER: #146
LINE COPY: Copy Basic Lines. #147
LINE CROSS REFERENCE: #148
LIST/DIR PAUSE: No more flybys! #149
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MASS INITIALIZATION: #152
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MESSAGE ANIMATOR: Great Billboard! #154
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REPLACE: Find/replace strings. #166
REVERSE VIDEO (GREEN): Eliminates eyestrain. #167
REVERSE VIDEO (RED): Eliminates eyestrain. #168
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SPEEDUP TUTORIAL: #172
SPOOLER : Speedup printouts! #173
SUPER INPUT/LINEINPUT: #174
SUPER COMMAND KEYS: #175
SUPER COPY: COPY multiple files. #176
SUPER EDITOR: Scroll thru Bas. Progs. #177
SUPER PAINT: 65535 patterns! #178
SUPER REPEAT: Repeat Key. #179
SUPER SCROLLER: View Scrolled Lines. #180
TAB/SHIFT LOCK KEYS: #181
TAPE ENCRYPT: Password protect Bas. Progs. #182
TEXT SCREEN DUMP: #183
TEXT SCREEN SCROLL LOCK: #184
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and their circulation figures were generated primarily by the number of magazines they *printed to be sold* (as compared to *actually* sold).

Yes, we're not as thick as we were, but I feel we're working harder on quality. The desktop publisher program we are printing in this issue is but one example of our efforts to bring you more quality in the future. You will see more examples of this sort of thing.

Can you help us? Yes, of course you can. And, at the same time, you'll be helping the CoCo Community itself grow stronger, too.

First, patronize our advertisers. I know it is a trite saying, but it is a very important one. If someone advertises in these pages, let them know you saw their ad. If they don't advertise, and you hear about them in some other way, ask them, "Why not?" Second, and just as important, continue to subscribe. Help us by renewing your subscription when you get your notice (we only send one!). And just as important, help us get new subscribers. Encourage others to join our ranks.

Yes, we're doing OK. But we'd like to do better. It'll help us do a better job for you.

* * *

While on the subject of advertising, I would like to mention a recent mail-order computer sales scam about which many of you have, no doubt, heard.

One of the reasons for my writing is to reassure you. We're not looking to pat ourselves on the back, but, at the same time, when we accept advertising for a magazine like this one — in a field where there is a great deal of mail-order buying and selling — we have to do a little more than make cursory checks.

One of our ad sales people got a call several weeks ago from a company called Compusystems in California. The company wanted to advertise in this magazine and sent an impressive array of credit materials: an audited financial statement from a certified public accountant, bank references, business references and the like. All including telephone numbers, addresses and so forth. The company listed assets of more than $6 million and an inventory of about $4.5 million. Not too shabby. They wanted to run a full-page advertisement offering excellent prices on both software and hardware.

> ***"That seemed somewhat suspicious, but, after all, we're a magazine, not a detective agency."***

Our credit department checked their references. All of them checked out very well — the companies they were doing business with, the bank, the CPA firm. In fact, the reports were glowing.

However, our sales rep was somewhat disconcerted. It seemed that everyone she talked with sounded alike; no matter who she called, and no matter what number, the voices were of the same man and the same woman.

That seemed somewhat suspicious, but, after all, we're a magazine, not a detective agency. All the phone numbers were different and even in different area codes. We checked with information, which had all the companies listed.

Every time we checked, though, even in different area codes, we discovered the same two voices. Then, upon realizing that there had recently been some changes in the Los Angeles area code — so that either one could be used for a time — we decided to do a little more investigating.

A call to the Federal Reserve Bank in Los Angeles revealed that the bank and the banker we had called did not exist. A call to the Los Angeles association of CPAs revealed no firm or accountant by the name we had been given. The Better Business Bureau had never heard of them.

We declined the advertisement, and we sent the information we had to the Federal Reserve and the CPA association for them to follow up.

Several other publications, including CW Communications' *Info World*, accepted it. In a story about the scam, which was run a week after the Compusystems full-page ad appeared, *Info-World* said that the credit was checked by "the credit department at IDG, *Info World*'s parent company." IDG, as many of you probably know, is a big company that owns a large number of magazines, including *80 Micro*.

I would not try to pretend that we were not concerned that we would not be paid for the ad — after all, that is the purpose of a credit check. But I am also glad that we're small enough to be thorough — and to prevent our readers from being caught in a scam.

— Lonnie Falk

Hint . . .

Returning from BREAK

I am sure there has been, or will be, a time in every computer user's life when a BASIC program stops because of an inadvertent press of the BREAK key. Many times, typing `CONT` doesn't get you back into the program. And, if you type `RUN`, all the variables and counters will be reset and you will lose any data you were working on. What do you do? Keep in mind that, in most cases, you can enter `GOTO` followed by the line number at which the program stopped execution. If it stopped with an error, use the next line number in the program. Such a re-entry preserves all data, `CLEAR` values and even the counter values in `FOR-NEXT` loops.

Darryl L. Petrak
House, NM

Hint . . .

Peeking the INKEY$

Most Color Computer programmers are aware of the `INKEY$` statement and how to use it to scan the keyboard for a specific key press. Quite a few of these people also know that you can use `EXEC 44539` for the same purpose. But, did you know that the ASCII value of the key press is stored and can be found at memory location 135? All it takes is a quick peek there and you can test for which key was pressed. This really helps if you are trying to do something fancy and need to perform calculations on the ASCII value.

Steven Shimatzki
Dunbar, PA

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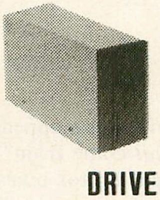

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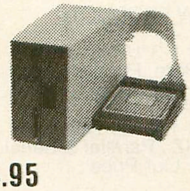

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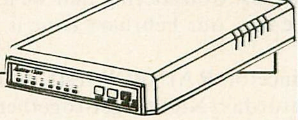

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Building October's Rainbow

"Adventuritis" strikes . . .

RAINBOWfest rounds the corner . . .

And, RAINBOW splashes on the color

A graphics Adventure game on Cray Augsburg's monitor stopped me in my tracks the other day. It was a stunner! "Where did *that* come from?" I quizzed him. "It's an Adventure Contest entry," our Technical Editor boasted in a playful, but keep-your-mitts-off tone.

As it turns out, it's this year's contest entry from last year's grand prize winner, Dr. Bruce K. Bell, and it's sure to be "in the money" when Cray, our contest chief judge, and his able assistant (and wife) Ruth Ann announce the contest winners in our February issue. A long time away, you say? Well, do remember you'll be getting that issue right at the beginning of the new year, and, since I was the chief judge of our last Adventure contest, believe me when I promise you they'll be quite busy over the next three months!

After all, there are entries from Maine to Florida, California to Washington. Would you just look at a sampling of some of these towns: Natrona Heights, Red Wing, Apulia Station, Dunkirk, Beeville, Dayton (Tennessee, not Ohio), Okanogan, York, Irmo, Chippewa Falls, Carigan, Ogalla, Villas, Crivitz, Kent, Toronto (Ohio), Olivet, Cynthiana, Kankakee, Lebanon, Crete — even some from Milwaukie (with an "ie" in Oregon and an "ee" in Wisconsin) and one from Miller Place. Yes, more readily known communities such as Tucson, Orlando, Montreal and Charleston are represented, too.

Add in all the others from Canada, many more from the United States and one from Cordoba, Argentina, and you get the idea. Since Judge Ruth Ann is also a registered nurse, maybe she'll have something for red eyes, insomnia and the other symptoms of "Adventuritis" that's bound to infect our judges. Considering that we'll be busy on our December holiday issue by the time you see this, our February issue is not as far away as it might seem.

What's just around the corner is our Princeton RAINBOWfest! We're finalizing the schedule, including the new "Delphi Saturday Night" get-together and our new "Educational Sandbox" programs for children and their parents. CoCo Cat's already packed! Our keynote speaker, RAINBOW's own Jim Reed, is so busy making notes that all of us here in Prospect are a bit nervous about what he's going to divulge when he "tells all."

With the great seminar lineup, you'll want to be there all day Saturday and Sunday if at all possible. Among our new speakers are copyright expert Professor Ed Samuels, OS-9 expert Greg Law and high-flying programmer Dr. Larry Preble. Longtime CoCo telecommunicator Don Hutchison is going to be "downloaded" from Atlanta via something he'd probably call "Delta protocol." I do hope you'll be able to make it to this 'fest, our fifth East Coast show, and get to know other members of our CoCo Community.

Have you noticed that we're "up" 16 pages this month? I know many of you have written in to comment on RAINBOW's size this summer, so it feels good to see our annual prediction that we'll get bigger in the fall and winter hold true again this year. You see, computer magazines in general have a slow spell in the summer, presumably because people are out in the sunshine and on vacation, etc., and then things get back into the groove as we head indoors again.

Speaking of annual events, this is our annual Graphics issue and we welcome H. Allen Curtis back to our pages, this time helping harness the power of the CoCo for desktop publishing! John Williams provides a new version of *CoCo Draw* to help you create Hi-Res graphics, and even OS-9 guru Dale Puckett is at the drawing board. Solla Carrock introduces *Animate* and *Picture Book* for displaying your creations and, if you're ambitious, you can produce movies, too! Bill Bernico's back again and so is Becky Matthews for "splash on the color" month as we explore the brightest side of CoCo.

So, the CoCo Adventure continues, our 14th RAINBOWfest beckons and you can color us excited in this seventh year of our CoCo Community. I hope you'll join with us as we keep exploring the CoCo world.

— Jutta Kapfhammer

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*- See July'87 Rainbow pg.17 & pg.69 for product descriptions !!!
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See 10/87 Rainbow review!

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PAL SWITCHER - Designed by Marty Goodman!

Have the best of both worlds by being able to switch between CoCo II and CoCo III modes when using a Multi-Pak Interface. Req. OLDER PAL & NEW PAL chip for the 26-3024 Multi-Pak Interface **$29.95**/with NEW PAL chip **$39.95**

RGB MONITOR - Better than TANDY CM-8!

Our monitor is more versatile than the Tandy CM-8! Includes RGB Analog, Color Composite & RGB TTL video input. Unlike the CM-8, PMODE 4 artifact colors don't show up BLACK & WHITE (thru the Color Composite input) Magnavox 8515 w/CoCo III cable **$329.95** - BONUS! Includes FREE $19.95 6' RGB Analog Video Ext Cable - Add $14 shipping.

CoCo III 512K RAM sticker **$4.99**
Level II Quick Ref Guide **$4.99**
Level II Basic09 binder ..**$9.95**

CoCo III Multipak PAL chip **$19.95**
CoCoIII Assembly Language .**$19.95**
Guide to CoCoIII Graphics .**$21.95**

Better CoCoIII Graphics **$24.95**
CoCo III Service Manual **$39.95**
512K CoCo III Computer **$299.95**

FASTDUPE 512 - Format & Backup SS/DS, 35/40 trk disks in ONE PASS! Even OS9 Level II! Up to 4 DRIVES! **$19.95**
BIG BUFFER - 437,888 byte spooler for 512K CoCoIII! Print up to 200 text pages while using your CoCo! **$19.95**

512K
CoCo III
Software

Buy'em
both for
$29.95

All orders plus $3 S/H (Foreign add $5) - NYS Residents add Sales Tax
Most orders shipped from stock. Please allow 1-3 weeks for processing backorders.

SPECTRUM PROJECTS

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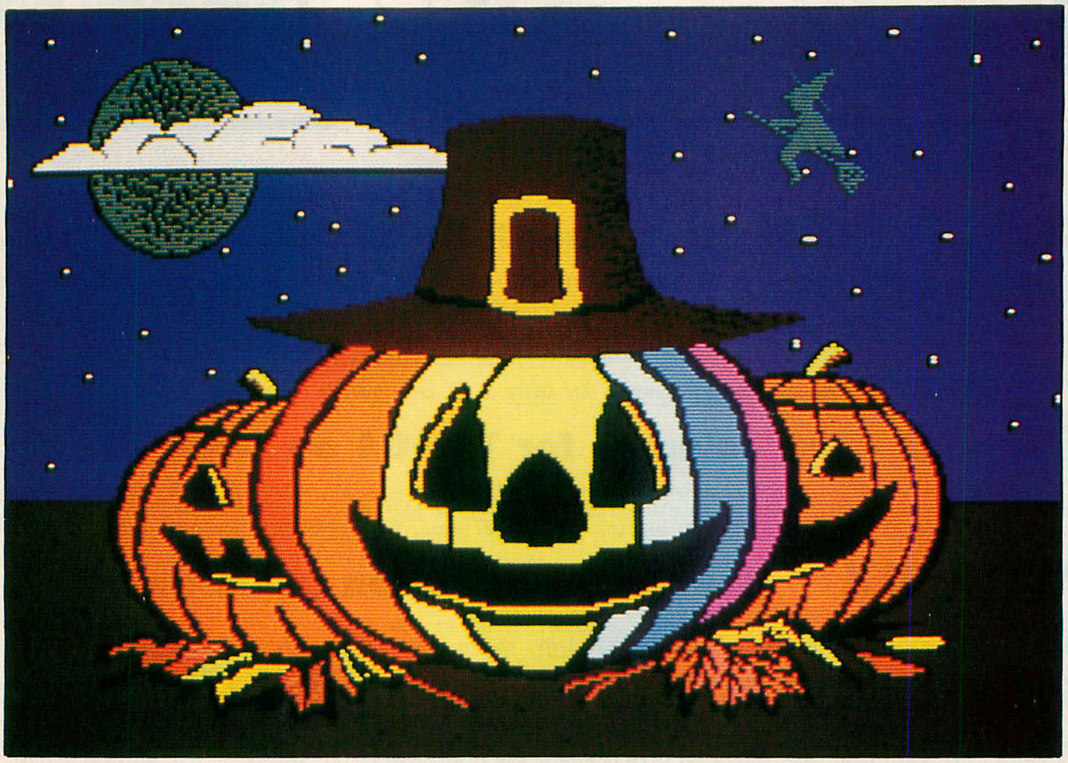
See our other ad on page 67

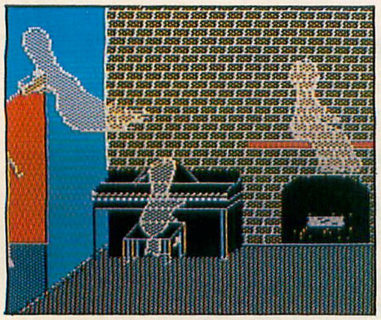
CoCo Gallery



Logan Ward **Rainboween**

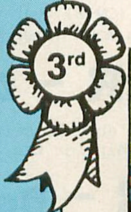
This multicolored scene was developed with *Color Max 3*. Logan also designs the Maxwell Mouse cartoons printed in THE RAINBOW, and lives in Memphis, Tennessee.

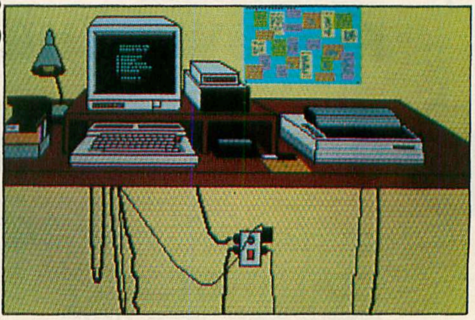
Honorable Mention



Tina and Robert Hermanek **Haunted House**

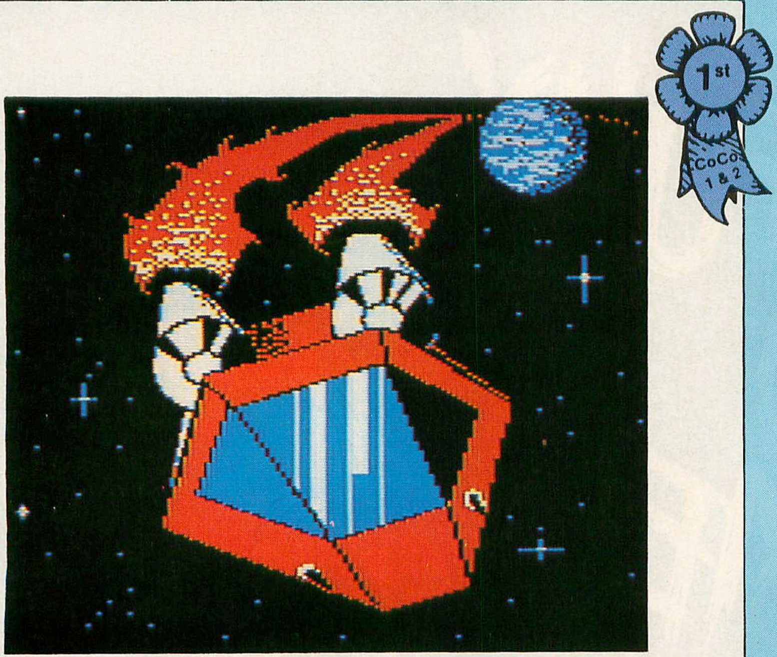
Tina and Robert, who live in Chaska, Minnesota, used BASIC to create this frightening scene.





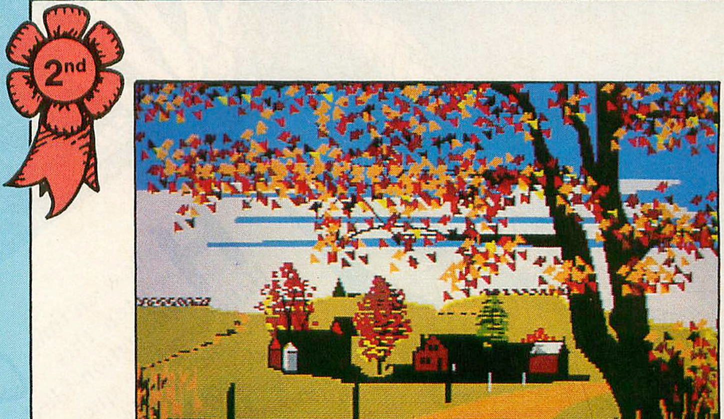
Chris Foster **CoCo 3**

This graphic creation shows the organization of Chris' computer setup and was created with *Color Max 3*. He lives in Texarkana, Texas, and is a sophomore in college.



Francisco Rios **Space Ace**

Francisco used a program he wrote to display his perception of a ship in outer space. He lives in Houston, Texas.



Dennis "CoCo" Hatton **Autumn**

Dennis created this rich and full-toned view of the harvest in BASIC on the CoCo 3. He lives in Cockeysville, Maryland.

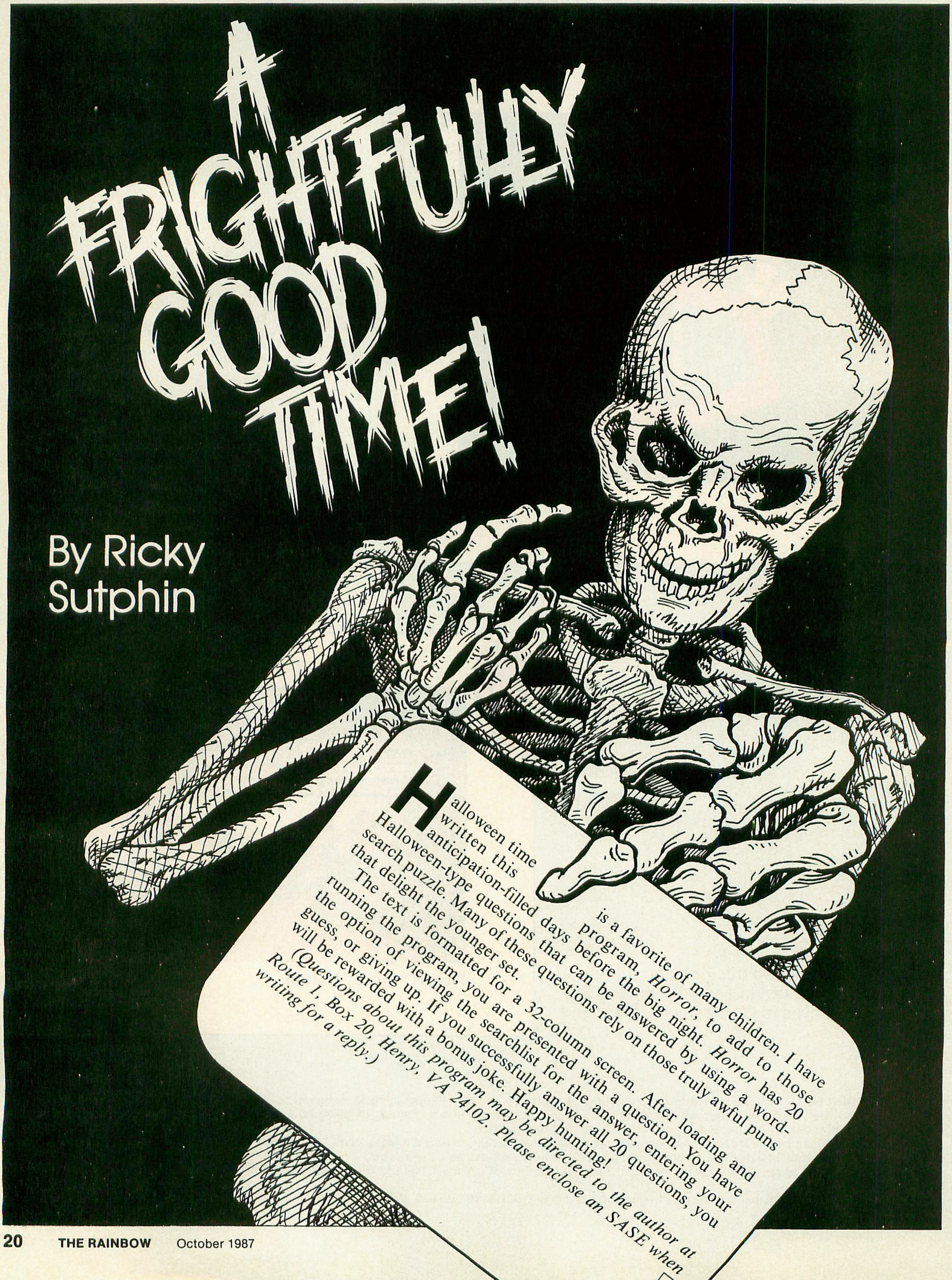
SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been *submitted* elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator



A FRIGHTFULLY GOOD TIME!

By Ricky Sutphin

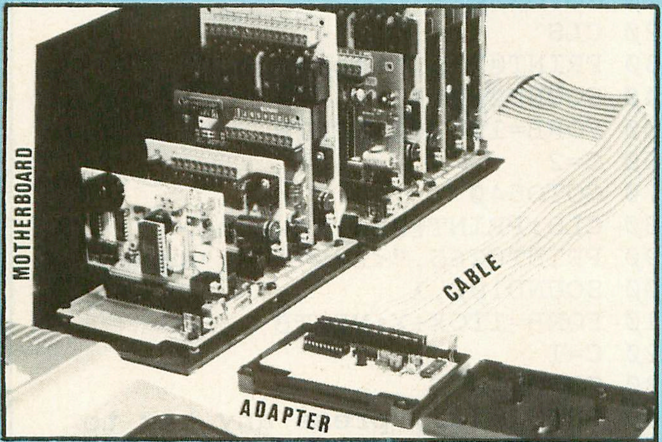
Halloween time is a favorite of many children. I have written this program, *Horror*, to add to those anticipation-filled days before the big night. *Horror* has 20 Halloween-type questions that can be answered by using a word-search puzzle. Many of these questions rely on those truly awful puns that delight the younger set.

The text is formatted for a 32-column screen. After loading and running the program, you are presented with a question. You have the option of viewing the searchlist for the answer, entering your guess, or giving up. If you successfully answer all 20 questions, you will be rewarded with a bonus joke. Happy hunting!

(Questions about this program may be directed to the author at Route 1, Box 20, Henry, VA 24102. Please enclose an SASE when writing for a reply.) □

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card **RE-140: $129**

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card **RE-156: $99**

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card **AD-142: $129**

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter **AN-146: $139**

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card **IN-141: $59**

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O **DG-148: $65**

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm **CL-144: $89**

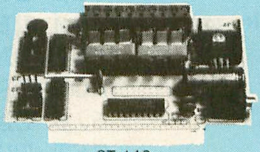
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

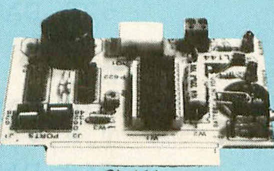
Touch Tone® Decoder **PH-145: $79**

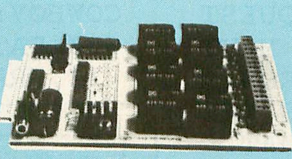
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

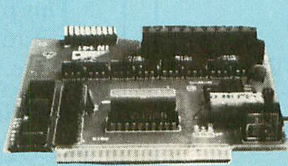
A-BUS Prototyping Card **PR-152: $15**

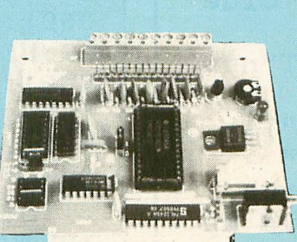
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s


ST-143


CL-144


RE-140


IN-141


AD-142

Smart Stepper Controller **SC-149: $299**

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option **RC-121: $49**
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option **PD-123: $89**
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option **BB-122: $19**
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver **ST-143: $79**

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors **MO-103: $15 or 4 for $39**

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot, Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) **CA-163: $24**

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: **CA-162: $34**

A-BUS Motherboard **MB-120: $99**

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT & NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

ALPHA *Products*
a Sigma Industries Company
242-W West Avenue, Darien, CT 06820

Technical info: **(203) 656-1806**
Orders only Except in CT **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

```
270 ......114
430 .......96
680 .......25
790 .......77
END .......4
```

The listing: HORROR

```
10 '(COMPUTECH-80 BBS)
20 'RICKY SUTPHIN
30 'ROUTE 1 BOX 20
40 'HENRY, VA 24102
50 '703-365-2018
60 '8PM-6AM MON-SUN 300 BAUD
70 '
80 'halloween horror find
90 '64K COCO 2
100 '
110 CLS0
120 X=1000
130 W$=CHR$(128)
140 PRINT@228,"halloween";W$;"ho
rror";W$;"find";
150 FORB=1TOX+X:NEXTB
160 PRINT@262,"by";W$;"ricky";W$
;"sutphin";
170 FORB=1TOX+X:NEXTB
180 FORB=1TO10
190 SOUND100,1
200 CLS
210 SOUND100,1
220 CLS0
230 SOUND100,1
240 CLS
250 NEXTB
260 PRINT@192,"HERE ARE 20 QUEST
IONS THAT ARE  ABOUT HORROR MOVI
ES OR THEME    CHARACTERS FROM H
ORROR MOVIES.  THE QUESTIONS ARE
 ARRANGED IN A WORDFIND FORMAT.
HAVE FUN!":GOSUB540
270 CLS
280 READA$,S,A1$
290 IFA$="END"AND S=999 AND A1$=
"END"THEN410
300 PRINT@5,"halloween horror fi
nd"
310 PRINT@128,"here are the clue
s:"
320 PRINT@192,A$:PRINT:PRINT"num
ber of letters:";S
330 PRINT@480,STRING$(31," ");
340 PRINT@352,"enter guess "
350 PRINT@384,"or h for search l
ist ":PRINT@416,"or q to give up
 ->";
360 INPUTG$
370 IFG$=""THEN300
380 IFG$="Q"THENPRINT@448,"the w
ord was-";A1$:FORB=1TOX+X:NEXTB:
GOTO270
390 IFG$="H"THEN C=3: GOTO810
400 IFG$=A1$THENGOSUB420ELSEGOSU
B480
410 GOTO950
420 CLS
430 PRINT@235,"!correct!"
440 SOUND200,1
450 FORB=1TOX+X:NEXTB
460 C=2
470 GOTO540
480 CLS:PRINT@235,"<wrong>"
490 PRINT@265,"<try";W$;"again>"
500 SOUND100,1
510 FORB=1TOX+X:NEXTB
520 C=1
530 GOTO540
540 PRINT@483,"press any key to
continue";
550 I$=INKEY$:IFI$=""THEN550
560 IFC=1THEN300
570 IFC=2THEN270
580 IFC=3THENCLS:GOTO300
590 RETURN
600 DATA"ONE HUNGRY VAMPIRE TO A
NOTHER: 'HAVE A *****!'",5,HEART
610 DATA"I'VE A HUNCH YOU WON'T
GET THIS ONE.",9,QUASIMODO      -
620 DATA"NOT APPEARING THIS WEEK
: THE ********* MAN.",9,INVISIBL
E
630 DATA"WHAT THE BLOB IS BEST A
T.",7,GROWING
640 DATA"THE VAMPIRE'S FAVORITE
COWBOY: *** MASTERSON.",3,BAT
650 DATA"THE MOST FAMOUS FRANK!"
,12,FRANKENSTEIN
```

Two-Liner Contest Winner . . .

This program produces some very interesting designs by rotating each of five lines about the endpoint of the last line.

The listing:

```
0 COLOR1,0:PCLEAR8:PMODE4:PCLS:P
MODE4,5:PCLS:FORT=0TO4:D(T)=RND(
360):I(T)=RND(16)-8:L(T)=RND(25)
+9:NEXT:FORT=0TO1STEP0:PMODE4:GO
SUB1:PMODE4,5:GOSUB1:NEXT
1 X=128:Y=96:LINE-(X,Y),PSET:FOR
T=0TO4:X=SIN(D(T)/57)*L(T)+X:Y=C
OS(D(T)/57)*L(T)+Y:LINE-(X,Y),PS
ET:D(T)=D(T)+I(T):NEXT:SCREEN1,1
:RETURN
```

Sage Radachowsky
Bantam, CT

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

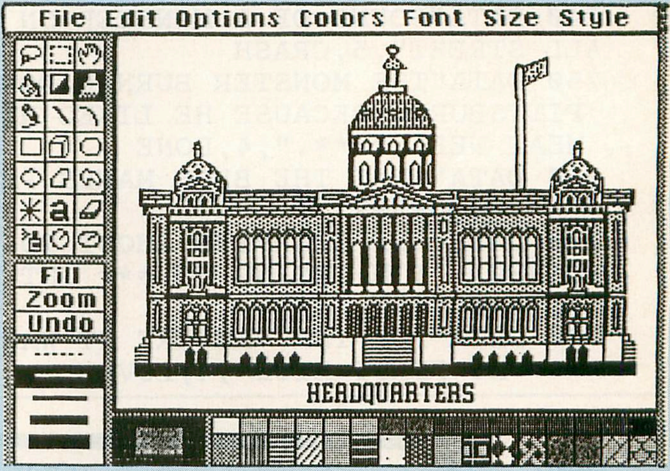
INTRODUCING THE NEXT GENERATION: CoCo Max™ III*

More Resolution More Power More Color Built-in Animation More Speed More Type Styles More Tools Amazing Color Sequencing

"The best program ever written for the Color Computer"

That's how thousands of enthusiastic users rated the **CoCo Max II** drawing program. With **CoCo Max III** we are ready to amaze them again. Instead of "patching" CoCo Max II, we rewrote it from scratch to take advantage of the CoCo Max III hardware. The results will knock your socks off! Below is a brief list of some of the *new* features, but some, such as **animation, color sequencing**, or the **slide show,** have to be seen. Send for the Demo Disk, and see for yourself.

Everybody's favorite drawing package features:
- A 50% larger editing window. - Zoom area **400%** larger. - New drawing tools: **rays, 3D cubes, arcs**,... - New editing tools: shadow, text size,... - Rotate by 1.5° steps - Select any 16 of the 64 possible colors (all 64 colors displayed at once!) - Powerful **color mix**: additive, subtractive, overlay,... - Full **color editing** of patterns and color changing patterns. - Incredible **special effects** with **color cycling** up to 8 colors with variable speed. -**Animation** adds the dimension of motion to your image. (Must be seen.) - Sophisticated data compression saves up to 70% of disk space when saving pictures.
In addition, there are dozens of enhancements to the multitude of features that made CoCo Max II a best seller.



Imagine this picture in sixteen colors!

Guaranteed Satisfaction
Use CoCo Max for a full month. If you are not delighted with it, we will refund every penny.

System Requirements:
Any CoCo 3 disk system with a Joystick or a Mouse.
We apologize to tape users, CoCo Max III needs the flexibility of a disk.

The **CoCo Max III** system includes: • The special Hi-Res interface (for your mouse or joystick) • The CoCo Max III disk • Many utilities: (To convert Max II pictures, Max II fonts, etc.) • A detailled User's Manual. Complete system; nothing else to buy. **CoCo Max III: $79.95***

More about CoCo Max III
- CoCo Max III is not an upgrade of CoCo Max II. It is entirely rewritten to take advantage of the new CoCo 3 hardware (More memory, resolution, colors, speed,...)
- The new CoCo Max III **Hi-Res Interface** and the CoCo Max II **Hi-Res Pack** are *not* interchangable.
- The new interface plugs into the joystick connector.
- The CoCo Max III disk is not copy protected.
- CoCo Max III only works with the CoCo 3.
- A Y-Cable or Multi-pak is not necessary.
- Colors are printed in five shades of gray.
- CoCo Max III can read CoCo Max II pictures and fonts.

Note: CoCo Max II (for the CoCo 2) is still available on disk ($79.95). CoCo Max I is still available on tape ($69.95). For details, refer to our double page ad in any *Rainbow* from January '86 to July '87

Toll Free operators are for orders only. If you need precise answers, call the **tech line.** (Detailled CoCo Max specs are included with the Demo Disk.)

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

Technical info: **(203) 656-1806**
Orders only Except in CT **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

* Beware of cheap and inferior imitations that *DO NOT* include a Hi-Res Interface or charge extra for each utility.

WITH COUPON ONLY

FREE DEMO DISK

Name

Street

City

State Zip

Printer used:

Please include $2 to help defray Processing and Shipping costs. (Check, Money Order, etc. Sorry, no COD or Credit Cards). Coupon (or copy) must be mailled to:

COLORWARE
A division of Sigma Industries, Inc.

COLORWARE
242-W West Avenue
Darien, CT 06820

```
660 DATA"IS BELA A NAME FOR A FE
LLA?",6,LUGOSI
670 DATA"MONSTERS' FAVORITE COME
DIAN: **** HOPE.",4,BLOB
680 DATA"ONE GIANT ANT TO ANOTHE
R: 'HE **** ME!'",4,BUGS
690 DATA"MAKE A FACE, LON.",6,CH
ANEY
700 DATA"MONSTERS EAT HERE.",9,C
LEVELAND
710 DATA"SOUND OF A SAD GHOST.",
6,BOOHOO
720 DATA"THE KING",4,KONG
730 DATA"WHAT THE MONSTER SAID A
FTER EATING STEVE MARTIN.",9,EXC
USE ME
740 DATA"SOUND OF A MONSTER ON W
ALL STREET",5,CRASH
750 DATA"THE MONSTER BURNED DOWN
 PITTSBURGH BECAUSE HE LIKED HIS
 MEAT WELL ****.",4,DONE
760 DATA"WHAT THE BLOB MAKES PEO
PLE",6,QUEASY
770 DATA"ONE STARVING GHOST TO A
NOTHER: 'I'M TRYING TO *** OUT A
 LIVING!'",3,EEK
780 DATA"FOR THE VAMPIRE IT WAS
**** AT FIRST BITE",4,LOVE
790 DATA"WHERE THE MONSTERS GET
THEIR CARS: ****** RENT-A-CAR.",
6,HEARSE
800 DATA"END",999,"END"
810 CLS:PRINT@11,"searchlist":PR
INT
820 PRINTTAB(10);"cbexcusemebc"
830 PRINTTAB(10);"bhtraehbcdbd"
840 PRINTTAB(10);"frankenstein"
850 PRINTTAB(10);"ombnmbcbldma"
860 PRINTTAB(10);"bdonecdbugsl"
870 PRINTTAB(10);"mnobcyicgbde"
880 PRINTTAB(10);"alhmbsblobhv"
890 PRINTTAB(10);"growingbsdee"
900 PRINTTAB(10);"brovdsbciral"
910 PRINTTAB(10);"kongebahsarc"
920 PRINTTAB(10);"midcbldumcsr"
930 PRINTTAB(10);"ldcysaeuqeek"
940 GOTO540
950 CLS
960 PRINT@160,"DID YOU HEAR ABOU
T THE GIRL WHO MARRIED THE OLD E
GYPTIAN KING?  WELL IT TURNS OUT
 THAT SHE WAS  ONLY AFTER HIS MU
MMY!":PRINT:PRINT:PRINTTAB(12);"
bye now!":GOTO960
970 K COCO 2
```

NEW

COLOR TALK 3

The Complete Terminal/Communications Program you've been waiting for!

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Screen Scrolling Made Easy

More than games, more than Adventures, more than utilities — come to think of it, more than almost any other aspect of computing, my favorite part is discovering new ways to improve my own original programs. Programming hints and tips are tucked away on a special disk all their own in my collection, and I refer to them often.

I recently added another helpful hint to that disk, concerning Hi-Res graphics screen presentations. Normally, after I've displayed a picture or graphics text, or both, and I want to move on to the next part of the program, I include the `PCLS` command to clear the screen and make room for whatever is coming up next.

This is technically the correct procedure, but by itself it is rather bland and unexciting. With the procedure described here you'll be able to display your graphics screen as usual, but when it comes time to move on to the next screen, you can scroll the contents off instead of quickly erasing them, as with the `PCLS` command.

If you'd like to save some time entering the program from the keyboard, you can leave out lines 10 through 40 and any odd-numbered line. They are merely remark statements describing what's happening in the next line. For example, Line 45 tells you what the purpose of Line 50 is. The `REM` lines are there to help you understand how to modify this procedure to suit your own program.

Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wisconsin.

By
Bill Bernico

Basically, there are three steps to this procedure. First, define the scroll address and assign it to the variable A, as in Line 50. Next, set up the graphics screen and draw your picture, text or whatever. Lastly, after the screen is displayed, `EXEC` the variable from Line 50 — in this case you will type `EXEC A`. This starts the scrolling and continues until the screen is clear.

Notice the remark in Line 65. It says that if you frame the screen *all* the way to the bottom (vertical screen position 191), it will scroll up black instead of white. Keep this in mind when drawing a picture or text. Avoid drawing down as far as 191 if you want a "clean" scroll.

Finally, it's just as easy to use this procedure with binary picture files. For example, if you want to make a binary picture file of these particular screen contents, type in lines 60 to 210, leaving out the remark lines in between. Then type `220 SAVEM"PICTURE",3584,9727,3584` and run the program, making sure you have a disk in the drive. This will create a binary picture file for later use.

Your next step is to type in lines 50, 60, 220 and 230, leaving out *all* other lines. Now add `70 LOADM"PICTURE"` and save this five-line program as your "loader" program. When run, it will load the picture file and wait for you to press any key before scrolling up and off the screen. You can substitute any other picture file you like. The effect is really worthwhile.

(Questions or comments may be addressed to the author at 708 Michigan Avenue, Sheboygan, WI 53081. Please enclose an SASE when requesting a reply.) ☐

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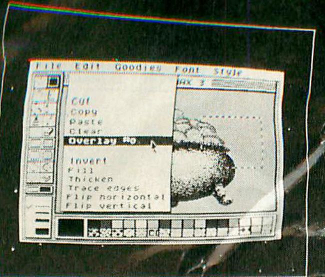
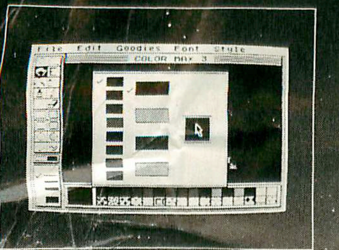

File Edit Goodies Font Style
Cut
Copy
Paste
Clear
Overlay Mg
Invert
Fill
Thicken
Trace edges
Flip horizontal
Flip vertical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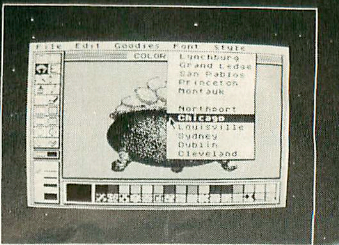
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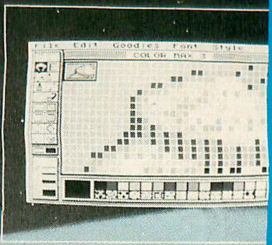
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INTRODUCING

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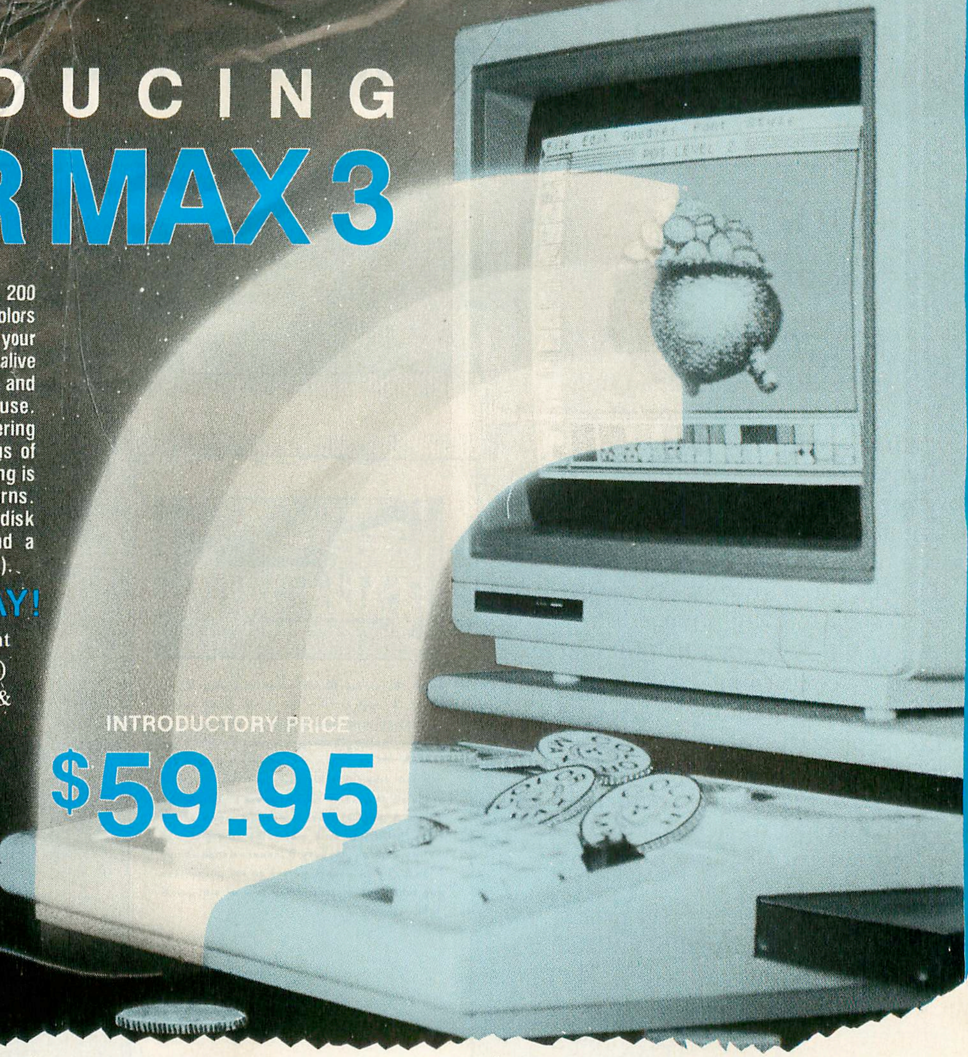

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The listing: `SCROLL`

```
10 'GRAPHICS SCREEN SCROLL
20 'FROM KROMICO SOFTWARE
30 'BY BILL BERNICO
40 '
45 'FIND SCROLL START ADDRESS
50 A=(PEEK(27)*256+PEEK(28))-543
55 'SET UP HI-RES SCREEN
60 PMODE4,1:PCLS1:SCREEN1,1:COLO
R0,1
65 'FRAME THE GRAPHICS SCREEN..
   IF YOU CHANGE (255,190) TO
   (255,191) IT WILL SCROLL UP
   IN BLACK INSTEAD OF WHITE
70 LINE(0,0)-(255,190),PSET,B
75 'DRAW A SQUARE IN THE UPPER
   LEFT CORNER OF THE SCREEN
80 DRAW"BM10,10R30D30L30U30
85 'POKE FOR ORANGE COLOR PAINT
90 POKE 178,1
95 'PAINT UPPER LEFT SQUARE
100 PAINT(12,12),,0
105 'POKE TO CANCEL ORANGE COLOR
110 POKE 178,0
115 'DRAW A DIAMOND IN THE LOWER
    RIGHT CORNER OF THE SCREEN
120 DRAW"BM200,160E20F20G20H20
125 'POKE FOR BLUE COLOR PAINT
130 POKE 178,3
135 'PAINT LOWER RIGHT DIAMOND
140 PAINT(205,160),,0
145 'POKE TO CANCEL BLUE COLOR
150 POKE 178,0
155 'DRAW CIRCLE IN CENTER
160 CIRCLE(128,96),50
165 'POKE FOR STRIPED COLOR
170 POKE 178,100
175 'PAINT CIRCLE WITH STRIPES
180 PAINT(128,96),,0
185 'POKE TO CANCEL STRIPE COLOR
190 POKE 178,0
195 'DRAW LETTERS TO SPELL OUT
"SCROLL TEST" IN UPPER RIGHT
200 DRAW"BM138,28R5U4L5U4R5BR4NR
5D8R5BR4U8R4FD2GL3F4BR4NR6U8R6D8
BR4NU8R5BR4NU8R5BM200,20R6L3D8BR
7NR5U4NR4U4R5BR4NR5D4R5D4L5BR12U
8L3R6
205 'DRAW LETTERS TO SPELL OUT
"HIT ANY KEY" IN LOWER LEFT
210 DRAW"BM20,175D8U4R5U4D8BR5U8
BR4R6L3D8BR13U8R5D4NL5D4BR4U8DF6
DU8BR4DF2E2UDG2D5BR12U8D4NE4F4BR
4NR5U4NR4U4R5BR4DF2E2UDG2D5
215 'PAUSE THE SCREEN UNTIL YOU
    HIT ANY KEY
220 IF INKEY$=""THEN 220
225 'ONCE A KEY IS HIT, BEGIN
    SCREEN SCROLLING
230 EXEC A
240 CLS:LIST-30
```

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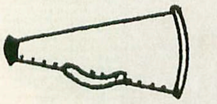

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The Queens Quarrel

By Scot Allen

Queens Quarrel is a puzzle written in BASIC for the Color Computer 3. The object is to place eight queens on a chess board so that no one may capture another — that is, no piece may line up with another either vertically, horizontally, or diagonally.

Just load and run the program. The title screen will appear and the letters will change colors. You'll then be asked whether you're using an analog RGB monitor or a composite monitor (television). After you answer the question, the chess board pops up on the screen with a flashing box in the center.

To put a queen on the board, just move the flashing box to the desired square using the arrow keys and press ENTER. If you have made a legal move, then a white queen appears in the square. If you cannot place a queen in the square, then you have attempted an illegal move (another queen is in line with the square) and need to try some other square or remove another piece or pieces from the board. To remove a piece from the board, just move the flashing box over the piece, press ENTER, and the piece will vanish.

Get all eight queens on the board and you'll see "you win" on the screen. If you get too frustrated, you may press the S and the computer will show you a possible solution to the puzzle.

(Questions about this program may directed to the author at 6905 Kinard Road, Plant City, FL 33566, 813-986-1645. Please enclose an SASE when writing for a reply.) ☐

Scot Allen is a 16-year-old junior at Plant City High School in Plant City, Florida. He has owned a Color Computer for many years and has recently bought a Color Computer 3.

```
200 ......223
330 ......199
440 ......229
END .....244
```

The listing: QUEENS

```
10 ONBRKGOTO580:POKE&HFFD9,1:REA
DSX,SY:DIMGD(7,7):FORI=0TO15:PAL
ETTEI,0:NEXT
20 HSCREEN2:HCLS0:WIDTH32:POKE&H
95C9,&H7F:POKE&HE6C6,18:POKE&HE6
C7,18:POKE&HFF22,&H10
30 PRINT@108,"Queens'"
40 PRINT@172,"Quarrel"
50 PRINT@239,"by"
60 PRINT@299,"Scot Allen"
70 POKE&HE6,2
80 HBUFF1,400
90 HDRAW"C15BM16,0RF2RFG3DF2L2D6
FDF2R2DFL15EUR2E2UEU6L2E2UH3ERE"
:HPAINT(17,1),15:HDRAW"C14BM-3,+
3R9BM-1,+6L7"
100 HGET(0,0)-(31,23),1:HCLS13
110 FORX=1TO8
120 FORY=1TO8
130 PALETTE12,X*8+Y
140 IFX=INT(X/2)*2THENC=8ELSEC=1
0
150 IFY=INT(Y/2)*2THENIFC=8THENC
=10ELSEC=8
160 HCOLORC
170 HLINE(X*32,Y*24-24)-(X*32+31
,Y*24),PSET,BF
180 NEXTY,X
190 PRINT:PRINT"  Do you have a
n RGB monitor"
200 PRINT"  or a composite monit
or (tv)?"
210 PRINT"              R or C"
220 M$=INKEY$:IFNOT(M$="c"ORM$="
C"ORM$="r"ORM$="R")THEN220
230 HSCREEN2:IFM$="c"ORM$="C"THE
NPALETTE7,22:PALETTE5,22:PALETTE
0,48:PALETTE1,32:PALETTE8,38:PAL
ETTE10,6:PALETTE15,48:PALETTE14,
32:GOTO250
240 PALETTE7,38:PALETTE5,38:PALE
TTE0,63:PALETTE10,33:PALETTE1,56
:PALETTE8,51:PALETTE15,83:PALETT
E14,56
250 X=3:Y=4
260 HPUT(X*32+38,Y*24+4)-(X*32+5
7,Y*24+20),1,NOT:HPUT(X*32+38,Y*
24+4)-(X*32+57,Y*24+20),1,NOT
270 IFSO=1THENGOSUB360ELSEA$=INK
EY$:IFA$=""THEN260
280 PLAY"O5T255CD"
290 IFA$="S"ORA$="s"THENSO=1
300 IFA$="^"THENIFY>0THENY=Y-1EL
SEY=7
310 IFA$=CHR$(10)THENIFY<7THENY=
Y+1ELSEY=0
320 IFA$=CHR$(8)THENIFX>0THENX=X
-1ELSEX=7
330 IFA$=CHR$(9)THENIFX<7THENX=X
+1ELSEX=0
340 IFA$=CHR$(13)THENIFGD(X,Y)=0
THENGOSUB480ELSEGD(X,Y)=0:NQ=NQ-
1:HCOLORHPOINT(X*32+32,Y*24+1):H
LINE(X*32+32,Y*24+1)-(X*32+61,Y*
24+23),PSET,BF
350 GOTO260
360 IFGD(SX,SY)THENREADSX,SY:GOT
O360
370 FORI=0TO7:IFGD(I,SY)THENFL=1
:XC=I
380 NEXT:IFFL=0THEN410
390 FL=0:IFX<XC THENA$=CHR$(9):R
ETURNELSEIFX>XC THENA$=CHR$(8):R
ETURNELSEIFY>SY THENA$="^":RETUR
NELSEIFY<SY THENA$=CHR$(10):RETU
RN
400 A$=CHR$(13):RETURN
410 FORI=0TO7:IFGD(SX,I)THENFL=1
:YC=I
420 NEXT:IFFL=0THEN450
430 FL=0:IFY<YC THENA$=CHR$(10):
RETURNELSEIFY>YC THENA$="^":RETU
RNELSEIFX>SX THENA$=CHR$(8):RETU
RNELSEIFX<SX THENA$=CHR$(9):RETU
RN
440 A$=CHR$(13):RETURN
450 IFX<SX THENA$=CHR$(9):RETURN
ELSEIFX>SX THENA$=CHR$(8):RETURN
ELSEIFY<SY THENA$=CHR$(10):RETUR
NELSEIFY>SY THENA$="^":RETURN
460 A$=CHR$(13):RETURN
470 GOTO360
480 I=0
490 IFGD(X,I)ANDSO=0THEN570
500 IFGD(I,Y)ANDSO=0THEN570
510 IFY-X+I<0ORY-X+I>7THEN530
520 IFGD(I,Y-X+I)ANDSO=0THEN570
530 IFY+X-I<0ORY+X-I>7THEN550
540 IFGD(I,Y+X-I)ANDSO=0THEN570
550 I=I+1:IFI<8THEN490
560 GD(X,Y)=1:HPUT(X*32+32,Y*24+
1)-(X*32+62,Y*24+23),1,OR:NQ=NQ+
1:IFNQ=8THENHCOLOR15:HPRINT(16,1
6),"You win!":PLAY"CDFGFGFDCGFDC
GD":FORI=0TO5000:NEXT:GOTO580
570 RETURN
580 POKE&HFFD8,0:IFM$="r"ORM$="R
"THENRGBELSECMP
590 DATA2,,1,2,,4,4,1,7,3,6,5,5,
7,3,6
```

Screen Dump Extraordinaire

By H. Allen Curtis

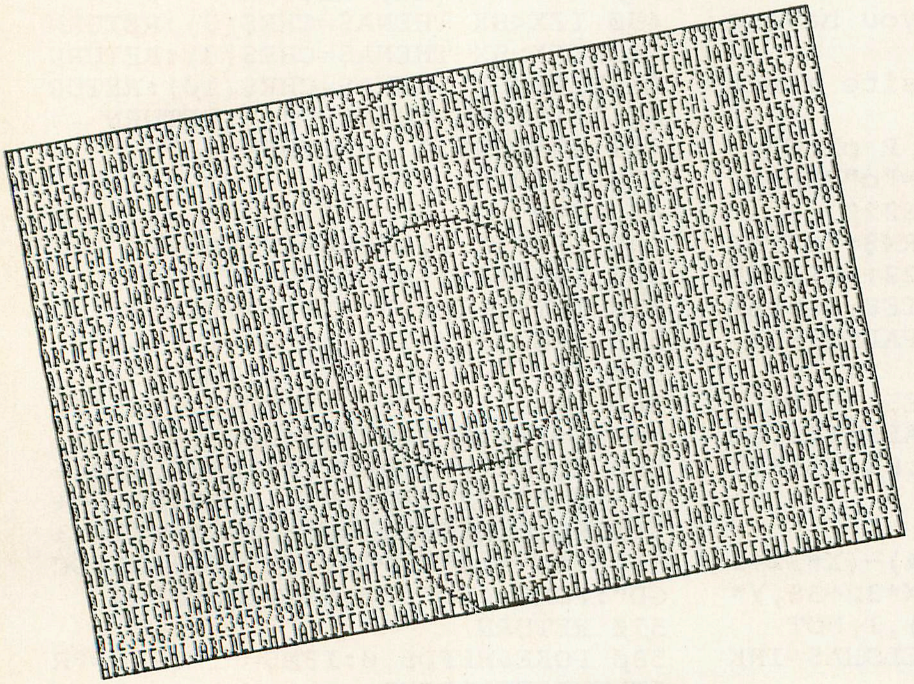

Figure 1: Upright Image of Test Screen

One of my greatest needs after purchasing a CoCo 3 was a fast, high resolution graphics screen dump. Because my printer offers many graphics options, I wanted a screen dump that could handle a variety of control codes. In writing a screen dump program to meet my own needs, I realized that my finished product could be readily adaptable to work with many other makes of dot matrix printers.

My screen dump, called `SCRNDMP`, is shown in Listing 1. It prints a 640-by-384 dot image of a Mode 1 or Mode 3 high resolution graphics screen. Each dot appearing vertically on the screen is printed twice to match more closely the CoCo 3 scaling of the graphics screen.

Because some printers won't support 640 dots across the page, I wrote a second screen dump, called `SCRNDMPS`, which is Listing 2. `SCRNDMPS` provides a sideways view of a Mode 1 or Mode 3 screen, a 384-by-640 dot image.

There's one restriction common to both `SCRNDMP` and `SCRNDMPS`: They can be used only with printers that can print a column of eight dots at each print position as the print head moves across the page. Having a Radio Shack LPVII for a backup printer, I knew that it and LPVIII can only print graphics columns seven dots high. Therefore, I wrote a third screen dump specifically for those two printers; it's called `LP78DMPS` and is shown in Listing 3. Like `SCRNDMPS`, it yields a 384-by-640 dot image of a Mode 1 or Mode 3 screen.

`LP78DMPS` also works with the Radio Shack DMP-200 printer. For a well-proportioned printed image, the DMP-200's elongated print mode should be used. Deleting the apostrophe from Line 45 of Listing 3 allows a proper "elongated" screen dump for the DMP-200. Just send the elongation control-code before running the program. If you have some other Radio Shack printer, you may find that `LP78DMPS` will also work for it.

H. Allen Curtis lives in Williamsburg, Virginia. He is interested in 17th and 18th century history and enjoys biking through the colonial capital. He balances past and present with his computer work.

All three screen dumps contain pokes of data values to CoCo 3's memory. A typing error associated with a poke address could lead to a program self-destruct situation. Therefore, it's advisable to save the typed screen dump before running it. When you do run it, you may be greeted with either an OD Error message or a Data Error message. The omission of one or more data values or of one or more commas in a `DATA` statement (lines 400 to the end of each listing) is a likely cause of an OD Error. Typing one or more data values incorrectly will cause the appearance of the Data Error message.

For your initial use of `SCRNDMP` or `SCRNDMPS`, have your printer manual handy. You'll need to consult the manual to determine ASCII control code sequences that these two programs require. Through a series of prompting messages, each of these programs will tell you what kinds of control code sequences are needed and what their purposes are. Additionally, editing lines 320 through 350 of either of these two programs lets you take any of four different options.

In brief, the four options are as follows:

1) Reverse dot in eight-dot column.
2) Allow negative image.
3) Set line feed.
4) Set baud.

The first option means that a printer, in producing a column of eight dots, responds to an eight-bit character code. Usually the top through bottom dots printed correspond to the highest through lowest bit positions, respectively, of the associated character code.

Some printers require codes whose low to high bit positions cause the printing of the top to bottom dots. The option associated with Line 320 allows the reversal of the bit structure of the codes for eight-dot columns.

The second option permits the printing of a negative, rather than a positive, image of the Hi-Res graphics screen.

Some printers provide an automatic line feed with every carriage return. Other printers don't. The third option is a necessity for printers that do not have one.

The CoCo 3 sets the rate at which it sends information to the printer at 600 baud. If your printer accepts information at a higher rate, you may want to take the fourth option.

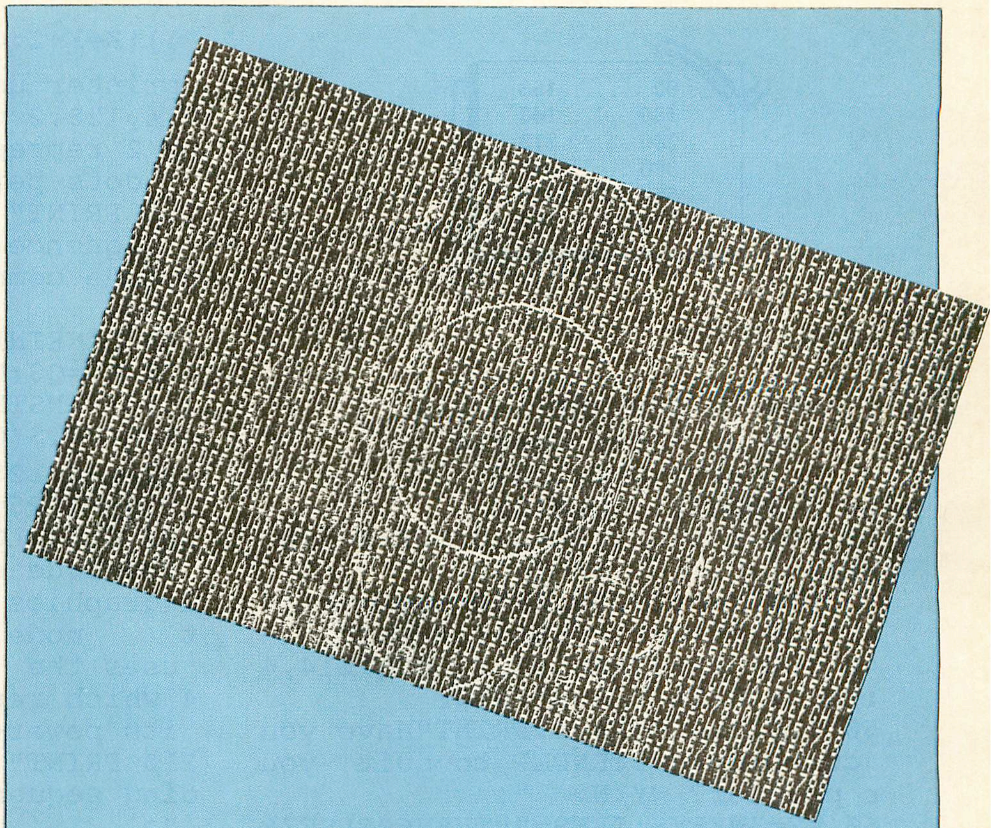

Figure 2: Upright Negative Image of Test Screen

Each of the options is taken by merely deleting the first apostrophe in its associated line — 320, 330, 340 or 350. The baud-setting option of Line 350 requires one further change. You must replace the question mark in the poke command with a number. The number should be 41, 18 (6 or 7) or 1 for baud rates of 1200, 2400, 4800 or 9600, respectively.

Listing 4 shows a program that provides a Mode 3 graphics screen suitable for testing the operation of each of the three screen dumps. The graphics screen consists of patterns of numbers and letters accompanied by a circle within a large ellipse. A bordering rectangle encloses all of this.

For printers that can print eight-dot columns, try `SCRNDMPS` first. If your printer needs a reversed eight-dot column and you do not take the first option, then the numbers and letters will be printed as mirror images of those on the test screen. Thus, for your first run of `SCRNDMPS`, print the test screen to determine whether you need to take the first option.

Use of `LP78DMPS` does not require any consultation of your printer manual. It also doesn't offer any options and doesn't set the baud rate: You must do this prior to running `LP78DMPS`.

Each of the BASIC programs generates and executes a machine language routine that does the actual screen dumping. These routines are stored and executed from the low resolution graphics screen area of CoCo 3.

If you have a disk system, Line 370 of each of the three BASIC screen dumps allows you to save the associated machine language routine. Merely delete the apostrophe in Line 370. Then when the program has completed a screen dump, the associated machine language routine will be saved on disk. Later, the saved machine language screen dump routine can be loaded and executed by employing one of the following command sequences:

```
LOADM"SCRNDMP":EXEC
LOADM"SCRNDMPS":EXEC
LOADM"LP78DMPS":EXEC
```

By deleting the apostrophes in lines 380 and 390 of the BASIC screen dumps, you can save the associated machine language routines on cassette tape. Each of these machine language screen dumps can later be loaded and executed by typing `CLOADM:EXEC` after you have positioned the tape appropriately. ☐

```
90 .......153
180 ......143
280 ......213
380 .......97
560 ......209
END .....150
```

Listing 1: SCRNDMP

```
5 '***    SCRNDMP    ***
    By H. Allen Curtis
      Copyright 1987
10 X=&H1200:WIDTH40
20 FOR I=0TO23:READ D:POKEX+I,D:
NEXT
30 FOR I=24TO299:READ D$:D=VAL("
&H"+D$):C=C+D:POKEX+I,D:NEXT
40 IFC=30030THEN50ELSELOCATE14,4
:PRINT"DATA ERROR":STOP
50 CLS2:LOCATE4,4:PRINT"Have you
 customized SCRNDMP to suit  you
r printer? <Y/N>  ";
60 K$=INKEY$:IFK$=""THEN60ELSEIF
K$="Y"THEN280
70 LOCATE4,7:PRINT"Consult your
printer manual to find  ASCII co
des for setting an 8 dot line
spacing.  If your printer only h
as an 8 dot line spacing for gra
phics, then    look for a code
or codes to turn on     graphics
.
80 PRINT"    As an example, one
printer uses the  ESCape code 27
, followed by 65 (the      ASCII
code for A), followed by 8 (the
  dot spacing).  For this code s
equence   you would type 27,65,8
.  Now, type the  sequence for y
our printer: ";
90 LINEINPUTQ$
100 C$=Q$:K=1:Z$=",0":L1$="400 D
ATA "
110 IFINSTR(C$,",")=0THEN120ELSE
C$=RIGHT$(C$,LEN(C$)-INSTR(C$,",
")):K=K+1:GOTO110
120 L1$=L1$+STR$(K)+","+Q$:FORJ=
1TO7-K:L1$=L1$+Z$:NEXT
130 CLS5:LOCATE4,4:PRINT"Next, f
ind the ASCII codes for      se
tting the desired graphics mode
and  the number of dots per lin
e.  SCRNDMP   requires 640 dots
per line.
140 PRINT"    As an example, one
")):K=K+1:GOTO180
 printer uses the  sequence 27,4
2,4,128,2 where the codes  128 a
nd 2 represent 128 + 2*256 = 640
  dots per line.
150 PRINT"    Now, type your cod
e sequence.    Remember to i
nclude commas between     codes
. ";
160 LINEINPUTQ$
170 C$=Q$:K=1:L2$="410 DATA "
180 IFINSTR(C$,",")=0THEN190ELSE
C$=RIGHT$(C$,LEN(C$)-INSTR(C$,",
190 L2$=L2$+STR$(K)+","+Q$:FORJ=
1TO8-K:L2$=L2$+Z$:NEXT
200 CLS3:LOCATE4,4:PRINT"Look up
 the code sequence to turn    of
f graphics and return to the tex
t    mode.  The example printer
 uses the      code sequence 27,6
4 which resets the    printer to
 its power-up state.
210 PRINT"    Type the correspon
ding sequence for  your printer.
 ";
220 LINEINPUTQ$
230 C$=Q$:K=1:L3$="420 DATA "
240 IF INSTR(C$,",")=0THEN250ELS
EC$=RIGHT$(C$,LEN(C$)-INSTR(C$,"
,")):K=K+1:GOTO240
250 L3$=L3$+STR$(K)+","+Q$:FORJ=
1TO6-K:L3$=L3$+Z$:NEXT
260 CLS6:LOCATE4,4:PRINT"Customi
ze SCRNDMP by EDITing lines   40
0, 410, and 420 to:":LOCATE4,9:P
RINTL1$:LOCATE4,11:PRINTL2$:LOCA
TE4,13:PRINTL3$:PRINT
270 PRINT:PRINT:PRINT"    If you
 have not already done so,      E
DIT lines 320-350 to take option
s you  want.":PRINT:PRINT"
  Then rerun SCRNDMP.":LOCATE0,
22:END
280 CLS5:LOCATE4,8:PRINT"Is your
 printer ready?  <Y/N> ";
290 K$=INKEY$:IFK$=""THEN290ELSE
IFK$="Y"THEN300ELSELOCATE2,10:PR
INT"Ready your printer and rerun
 SCRNDMP.":LOCATE0,22:END
300 CLS5:LOCATE4,8:PRINT"Do you
have a mode 1 or 3 screen      re
ady to dump?  <Y/N> ";
310 K$=INKEY$:IFK$=""THEN310ELSE
IFK$="Y"THEN320ELSELOCATE4,12:PR
INT"Run a program to generate th
e      desired screen.  Then r
eload SCRNDMP   and run it.":LO
```

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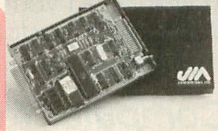

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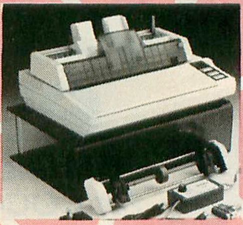

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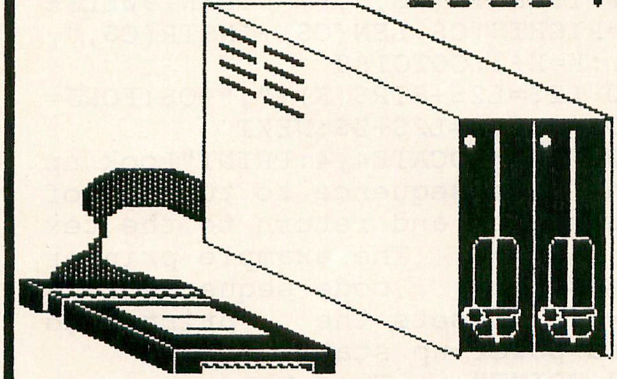
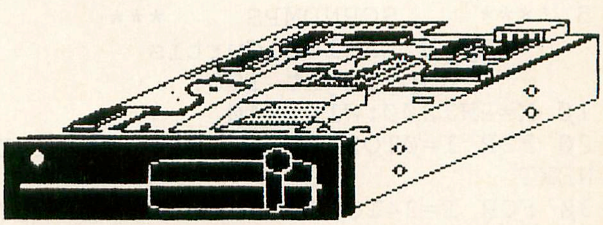
```
CATE0,22:END
320 'POKEX+276,33 'REVERSE DOTS
IN 8 DOT COLUMN
330 'POKEX+296,67 'NEGATIVE IMAG
E
340 'POKEX+46,189 'SET LINE FEED
350 'POKEX+70,? :X=X-4 'SET BAUD
360 EXECX+73
370 'SAVEM"SCRNDMP",&H1200,&H132
B,X+73
380 'CLS3:MOTORON:LOCATE4,4:PRIN
T"Position tape for recording.":
PRINT"    Then press any key.":G
OSUB390:MOTOROFF:ATTR5,6:PRINT"D
epress recorder buttons PLAY and
 RECORDand then press any key.";
:GOSUB390:CSAVEM"SCRNDMP",&H1200
,&H132B,X+73:END
390 'K$=INKEY$:IFK$=""THEN390ELS
ERETURN
400 DATA 3,27,65,8,0,0,0,0
410 DATA 5,27,42,4,128,2,0,0,0
420 DATA 2,27,64,0,0,0,0
430 DATA 34,10,30,8C,E3,8D,1B,35
,10,39
440 DATA 34,10,30,8C,E1,86,D
450 DATA BD,A2,85,86,A,8C,A2,85,
20,EA
460 DATA 34,10,30,8C,D9,20,E3
470 DATA E6,80,A6,80,BD,A2,85,5A
,26,F8,39
480 DATA C6,12,D7,96,C6,FE,D7,6F
,8D,C9
490 DATA 1F,52,31,A8,AD,1E,42,8E
,70,71
500 DATA BF,FF,A2,CE,40,0,C6,30,
D7,52
510 DATA C6,50,D7,51,8D,B9,8D,38
,8D,3E
520 DATA 8D,44,8D,4B,8D,53,8D,5C
,8D,66
530 DATA 8D,71,8D,7D,33,41,A,51,
26,E8
540 DATA 33,C9,0,F0,A,52,26,DA,8
E,7A,7B
550 DATA BF,FF,A2,1E,42,8D,A0,86
,D
560 DATA BD,A2,85,86,A,BD,A2,85,
F,6F,39
570 DATA BD,A2,85,1F,31,4F,C6,4,
D7,50,39
580 DATA E6,84,8D,58,26,FA,20,61
,E6,84
590 DATA 58,8D,4F,26,F9,20,58,E6
,84,58,58
600 DATA 8D,45,26,F8,20,4E,E6,84
```

COCO ACCESSORIES





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```
,58,58,58
610 DATA 8D,3A,26,F7,20,43,E6,84
,58,58
620 DATA 58,58,8D,2E,26,F6,20,37
,E6,84
630 DATA 58,58,58,58,58,8D,21,26
,F5,20,2A
640 DATA E6,84,58,58,58,58,58,58
,8D,13
650 DATA 26,F4,20,1C,E6,84,58,58
,58,58
660 DATA 58,58,58,8D,4,26,F3,20,
D,48,48
670 DATA 58,24,2,8A,3,30,88,50,A
,50,39
680 DATA 20,12,48,56,48,56,48,56
,48,56,48,56
690 DATA 48,56,48,56,48,56,1F,98
,12,16,FF,74
```

```
90 ........43
180 .......65
280 .......13
380 .....137
END .....141
```

Listing 2: SCRNDMPS

```
5 '***     SCRNDMPS     ***
    By H. Allen Curtis
      Copyright 1987
10 X=&H1200:WIDTH40
20 FOR I=0TO23:READ D:POKEX+I,D:
NEXT
30 FOR I=24TO192:READ D$:D=VAL("
&H"+D$):C=C+D:POKEX+I,D:NEXT
40 IFC=19727THEN50ELSELOCATE14,4
:PRINT"DATA ERROR":STOP
50 CLS2:LOCATE4,4:PRINT"Have you
 customized SCRNDMPS to suit you
r printer? <Y/N>  ";
60 K$=INKEY$:IFK$=""THEN60ELSEIF
K$="Y"THEN280
70 LOCATE4,7:PRINT"Consult your
printer manual to find  ASCII co
des for setting an 8 dot line
spacing.  If your printer only h
as an 8 dot line spacing for gra
phics, then     look for a code
or codes to turn on    graphics
.
80 PRINT"    As an example, one
printer uses the  ESCape code 27
, followed by 65 (the     ASCII
code for A), followed by 8 (the
 dot spacing).  For this code s
equence   you would type 27,65,8
.  Now, type the  sequence for y
our printer: ";
90 LINEINPUTQ$
100 C$=Q$:K=1:Z$=",0":L1$="400 D
ATA "
110 IFINSTR(C$,",")=0THEN120ELSE
C$=RIGHT$(C$,LEN(C$)-INSTR(C$,",
")):K=K+1:GOTO110
120 L1$=L1$+STR$(K)+","+Q$:FORJ=
1TO7-K:L1$=L1$+Z$:NEXT
130 CLS5:LOCATE4,4:PRINT"Next, f
ind the ASCII codes for      se
tting the desired graphics mode
and   the number of dots per lin
e.  SCRNDMPS  requires 384 dots
per line.
140 PRINT"    As an example, one
 printer uses the  sequence 27,7
5,128,1 where the codes    128 a
nd 1 represent 128 + 1*256 = 384
  dots per line.
150 PRINT"    Now, type your cod
e sequence.     Remember to i
nclude commas between      codes
. ";
160 LINEINPUTQ$
170 C$=Q$:K=1:L2$="410 DATA "
180 IFINSTR(C$,",")=0THEN190ELSE
C$=RIGHT$(C$,LEN(C$)-INSTR(C$,",
")):K=K+1:GOTO180
190 L2$=L2$+STR$(K)+","+Q$:FORJ=
1TO8-K:L2$=L2$+Z$:NEXT
200 CLS3:LOCATE4,4:PRINT"Look up
 the code sequence to turn    of
f graphics and return to the tex
t    mode.  The example printer
 uses the     code sequence 27,6
4 which resets the     printer to
 its power-up state.
210 PRINT"    Type the correspon
ding sequence for  your printer.
 ";
220 LINEINPUTQ$
230 C$=Q$:K=1:L3$="420 DATA "
240 IF INSTR(C$,",")=0THEN250ELS
EC$=RIGHT$(C$,LEN(C$)-INSTR(C$,"
,")):K=K+1:GOTO240
250 L3$=L3$+STR$(K)+","+Q$:FORJ=
1TO6-K:L3$=L3$+Z$:NEXT
260 CLS6:LOCATE4,4:PRINT"Customi
ze SCRNDMPS by EDITing lines  40
0, 410, and 420 to:":LOCATE4,9:P
RINTL1$:LOCATE4,11:PRINTL2$:LOCA
TE4,13:PRINTL3$
270 PRINT:PRINT:PRINT"    If you
```

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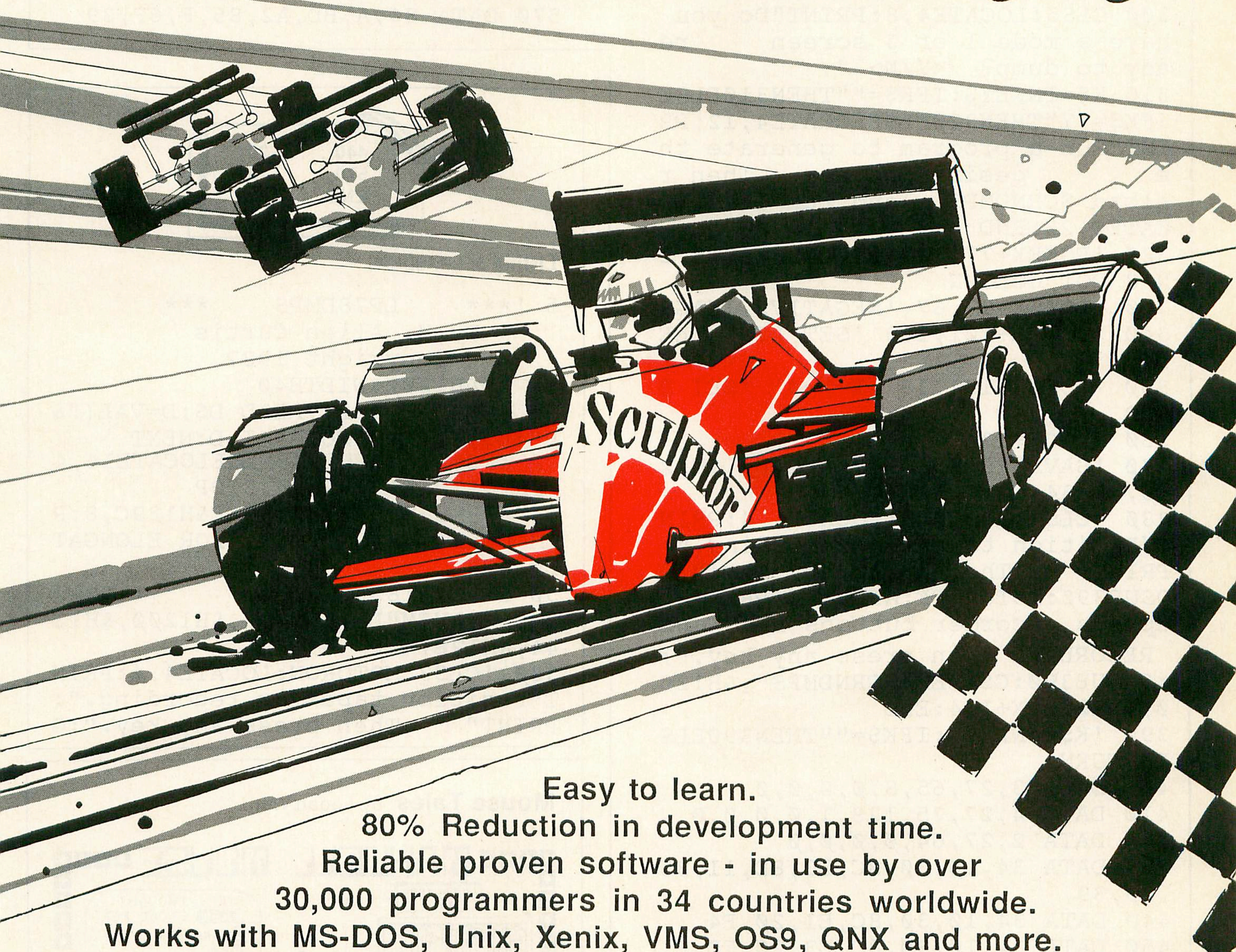

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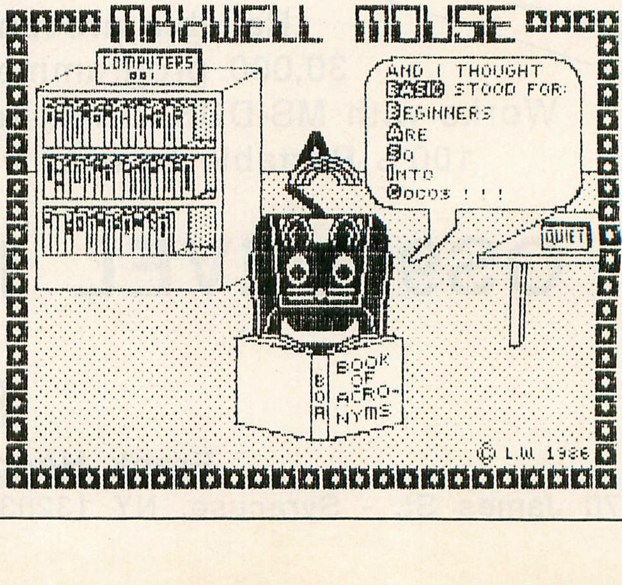
```
 have not already done so,      E
DIT lines 320-350 to take option
s you  want.":PRINT:PRINT:PRINT"
        Then rerun SCRNDMPS.":L
OCATE0,22:END
280 CLS5:LOCATE4,8:PRINT"Is your
 printer ready?  <Y/N> ";
290 K$=INKEY$:IFK$=""THEN290ELSE
IFK$="Y"THEN300ELSELOCATE2,10:PR
INT"Ready your printer and rerun
 SCRNDMPS.":LOCATE0,22:END
300 CLS5:LOCATE4,8:PRINT"Do you
have a mode 1 or 3 screen     re
ady to dump?  <Y/N> ";
310 K$=INKEY$:IFK$=""THEN310ELSE
IFK$="Y"THEN320ELSELOCATE4,12:PR
INT"Run a program to generate th
e        desired screen.  Then r
eload SCRNDMPS   and run it.":LO
CATE0,22:END
320 'POKEX+77,33 'REVERSE DOTS I
N 8 DOT COLUMN
330 'POKEX+97,67 'NEGATIVE IMAGE
340 'POKEX+101,189 'SET LINE FEE
D
350 'POKEX+131,18 :X=X-4  'SET B
AUD
360 EXECX+134
370 'SAVEM"SCRNDMPS",&H1200,&H12
C0,X+134
380 'CLS3:MOTORON:LOCATE4,4:PRIN
T"Position tape for recording.":
PRINT"    Then press any key.":G
OSUB390:MOTOROFF:ATTR5,6:PRINT"D
epress recorder buttons PLAY and
 RECORDand then press any key.";
:GOSUB390:CSAVEM"SCRNDMPS",&H120
0,&H12C0,X+134:END
390 'K$=INKEY$:IFK$=""THEN390ELS
ERETURN
400 DATA 3,27,65,8,0,0,0,0
410 DATA 4,27,75,128,1,0,0,0,0
420 DATA 2,27,64,0,0,0,0
430 DATA 34,10,30,8C,E3,8D,11,35
,10,39
440 DATA 34,10,30,8C,E1,20,F4
450 DATA 34,10,30,8C,E3,20,ED
460 DATA E6,80,A6,80,BD,A2,85,5A
,26,F8,39
470 DATA A6,84,8D,E,BD,A2,85,BD,
A2,85,30,88,B0,A,50,26,EF,39
480 DATA 20,12,48,56,48,56,48,56
,48,56,48,56
490 DATA 48,56,48,56,48,56,1F,98
,12,39
500 DATA 86,A,8C,A2,85,86,D,BD,A
2,85,C6,7,86,20
510 DATA BD,A2,85,5A,26,F8,8D,A9
,33,41,1F,31,C6,C0,D7,50,39
520 DATA C6,12,D7,96,C6,FE,D7,6F
,8D,8C
530 DATA 1F,52,31,A9,FF,70,1E,42
,8E,70,71
540 DATA BF,FF,A2,CE,7B,AF,C6,50
,D7,51
550 DATA 8D,C0,8D,96,A,51,26,F8,
8E,7A,7B
560 DATA BF,FF,A2,1E,42,17,FF,75
,86,D,BD,A2,85
570 DATA 86,A,BD,A2,85,F,6F,39
```

440 201
570 102
END 218

Listing 3: LP78DMPS

```
5 '***    LP78DMPS      ***
     By H. Allen Curtis
       Copyright 1987
10 X=&H1200:WIDTH40
30 FOR I=0TO324:READ D$:D=VAL("&
H"+D$):C=C+D:POKEX+I,D:NEXT
40 IFC=37030THEN45ELSELOCATE14,4
:PRINT"DATA ERROR":STOP
45 'POKE&H129B,32:POKE&H129C,8:R
EM DELETE APOSTROPHE FOR ELONGAT
ED USE
50 EXECX+183
370 'SAVEM"LP78DMPS",&H1200,&H13
44,&H12B7
380 'CLS3:MOTORON:LOCATE4,4:PRIN
T"Position tape for recording.":
PRINT"     Then press any key.":G
```

Mouse Tales by Logan Ward



```
OSUB390:MOTOROFF:ATTR5,6:PRINT"D
epress recorder buttons PLAY and
 RECORDand then press any key.";
:GOSUB390:CSAVEM"LP78DMPS",&H120
0,&H1344,&H12B7:END
390 'K$=INKEY$:IFK$=""THEN390ELS
ERETURN
400 DATA E6,84,8D,57,20,64,E6,84
,57,46
410 DATA E6,1,8D,4F,20,5A,E6,84,
58,58,58
420 DATA 58,58,58,8D,4B,E6,1,8D,
41,20,4A
430 DATA E6,84,58,58,58,58,58,8D
,3A,E6,1
440 DATA 8D,34,20,3B,E6,84,58,58
,58,58
450 DATA 8D,2A,E6,1,8D,28,20,2D,
E6,84,58
460 DATA 58,58,8D,1B,E6,1,8D,1D,
20,20
470 DATA E6,84,58,58,8D,D,E6,1,5
8,46,20,14
480 DATA E6,84,58,20,A7,58,46,58
,46,58,46
490 DATA 58,46,58,46,58,46,58,46
,39,46
500 DATA 8A,80,BD,A2,85,BD,A2,85
,A,50,39
510 DATA 8D,39,8D,86,26,FA,8D,13
,8D,31,8D,84
520 DATA 26,FA,33,41,8D,9,8D,27,
8D,84
530 DATA 26,FA,33,41,39,86,D,BD,
A2,85,86
540 DATA 1E,BD,A2,85,C6,7,86,20,
BD,A2,85
550 DATA 5A,26,F8,86,12,BD,A2,85
,1F,31
560 DATA C6,C0,D7,50,39,30,89,FF
,B0,4F,39
570 DATA C6,FE,D7,6F,8D,D4,1F,52
,31,A9
580 DATA FF,3F,12,1E,42,8E,70,71
,BF,FF,A2
590 DATA CE,7C,0,1F,31,CC,C0,B,D
D,50
600 DATA 8D,9E,8D,B7,8D,D5,17,FF
,41,26,F9
610 DATA 33,41,8D,AC,8D,CA,17,FF
,45,26,F9
620 DATA 33,41,8D,A1,8D,BF,17,FF
,48,26,F9
630 DATA 33,41,8D,96,8D,B4,17,FF
,4A,26,F9
640 DATA 33,41,8D,8B,8D,A9,17,FF
,4B,26,F9
650 DATA 33,41,8D,80,A,51,26,C1,
17,FF,5E
660 DATA 17,FF,76,8D,94,E6,84,58
,58,58
670 DATA 58,58,17,FF,3C,46,46,46
,46
680 DATA 17,FF,3C,26,EB,8E,7A,7B
,BF,FF,A2
690 DATA 1E,42,86,D,BD,A2,85,86,
1E,BD,A2,85,F,65,39
```

Listing 4: TESTSCRN

```
10 HSCREEN3
20 A$="0123456789":B$="ABCDEFGHI
J"
30 FORI=0TO22STEP2
40 HPRINT(0,I),A$+A$+A$+A$+A$+A$
+A$+A$
50 NEXT
60 FORI=1TO23STEP2
70 HPRINT(0,I),B$+B$+B$+B$+B$+B$
+B$+B$
80 NEXT
90 HCIRCLE(320,96),96,1,2
100 HCIRCLE(320,96),90,1
110 HLINE(0,0)-(639,191),PSET,B
```

STOCK MARKET PORTFOLIO FOR THE COLOR COMPUTER

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Stock Market portfolio for the color computer will keep track of all your current stock listings and keep a listing of stocks you have sold by the year, they were sold with all totals, profit and loss, and percentages. More than one person can use this program as long as the first three letters on both first and last name are not the same. The program is menu driven and will give you the option for either screen print or information to be printed on printer.

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Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

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You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

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Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately) or the Radio Shack Plug 'N' Power controller. For example, you can control your TV by saying "TV ON" or "TV OFF". . **$24.95**

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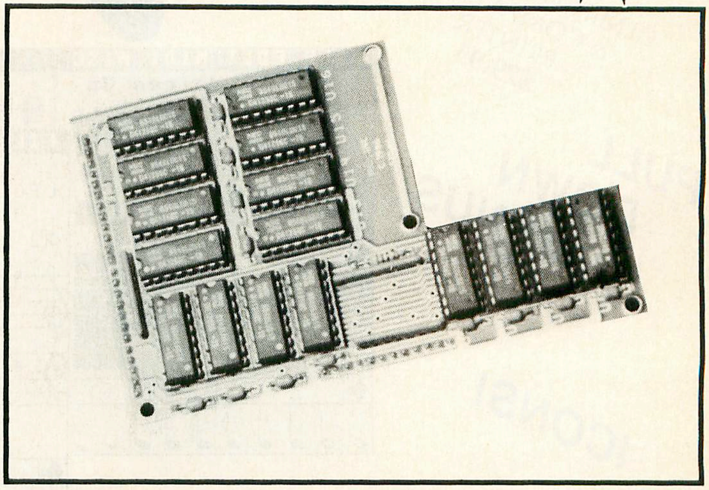

INSTALLATION

If you know how to hold a screwdriver, we're convinced you can install Turbo Ram in minutes. However, if you like, send us your COCO 3 insured, postage paid, and we will install it, pay the return postage and guarantee it for 1 year. **$15.00**

SATISFACTION GUARANTEED

If for any reason you wish to return Turbo Ram, you may do so within 15 days and be charged only a 10% restocking charge. You may keep the GIME CHIP Technical Specs, 512K Ram Test program and MUSICA RAM DISK, a $30 value.

TURBO RAM DISK

TURBO RAM DISK adds 2 lightning fast Ram Disks to your COCO system. Imagine saving and loading programs instantaneously and having hundreds of your programs "on line" for fast access. Single disk system users can use TURBO RAM DISK to easily make backups without continuously switching disks.

Requires 512K Turbo Charged COCO 3 . . . . **$24.95**
When purchased with TURBO RAM **$19.95**

COCO 3 128K

COLOR CONNECTION IV

This is the most comprehensive modem package for the COCO 3. All standard protocols are supported including CompuServe's Protocol B, XMODEM protocol, and XON/XOFF. Full support of the auto answer/auto dial feature for both Hayes compatible and some Radio Shack modems is provided. Single key macros allow easy entry of often-used passwords and ID's with a single key stroke.
Disk **$49.95**

COLOR SCRIBE III

This great Word Processor can take full advantage of the 80 column display of the COCO 3. Justification, Headers, Footers, and Pagination make it perfect for letters and documents as well as programming in BASIC, PASCAL, "C," and Assembly Language. Over 20 line editing commands include capabilities like character insert and delete, skip over words, breaking a line, and more!
Disk **$49.95**

THE MAGIC OF ZANTH

In the Land of Zanth, magic is commonplace. Dragons, Griffins, Centaurs and Demons abound. You are sent on a quest to discover the source of magic in the Land of Zanth. This intriguing adventure features over 2 dozen hi-res 16 color animated graphic screens, 4 voice music and sound effects. The 16 color, 320 x 192 graphics look great.
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This is the same Junior you've seen in the Kong arcade series, but with new COCO 3 graphics. This tireless little monkey must overcome all sorts of obstacles (4 screens worth) to rescue his father, The King, from the mean zookeeper. He will traverse the jungle and swamp, climb vines, avoid chompers and birds, open locks, and more before he finally meets with his big daddy. The 16 color, 320 x 192 graphics are superb.
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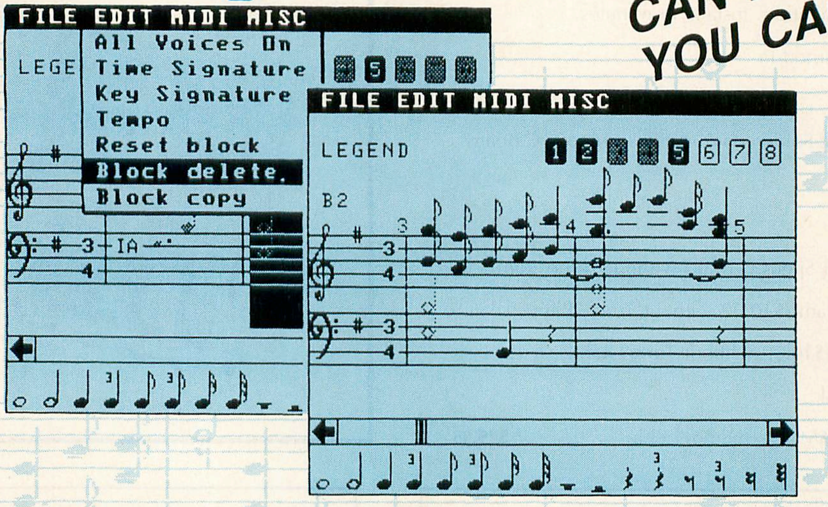

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Coco 1, 2, 3 Compatible

A MUST FOR MIDI USERS

LYRA is the most powerful music composition program we have seen on any computer. We don't mean just the COCO, we really mean any computer. Whether you are a novice trying to learn music or a professional musician with MIDI equipment you will find LYRA a powerful tool. You see, we wrote LYRA for musicians that hate computers. If you want proof, purchase a LYRA demo for $7.95. We will apply the demo price to your purchase. MIDI output requires the LYRA MIDI cable (#MC158) or COCO MIDI Seq/Editor (#CM147).

- Ultra Easy to use, just point with joystick or mouse and click.
- Compose with up to 8 completely independent voices.
- Room for over 18,000 notes. (This is not a misprint!)
- Super Simple Editing Supports:

Note insert	Block insert
Note delete	Block delete
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- Output music to:

TV Speaker	Monitor Speaker
STEREO PAK	ORCHESTRA 90
SYMPHONY 12	COCO MIDI S/E
MIDI Synth	MIDI Drum Machine

- Output up to 4 voices without additional hardware.
- Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- Output any voice on any of the 8 MIDI channels.
- Transpose music to any key.
- Modify music to any tempo.
- Automatically inserts bar for each measure as you compose.
- Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- Each voice may be visually highlighted or erased.
- Each measure is numbered for easy reading.
- Solo capability
- Block edits are highlighted.
- Tie notes together for musical continuity.
- Name of note pointed to is constantly displayed.
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- Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- Help menu makes manual virtually unnecessary.
- LYRA is 100% software, no need for extra hardware unless you want more power.
- Music easily saved to tape or disk.
- Requires 64K and mouse or joystick.

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LYRA OPTIONS

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A program to convert MUSICA 2 files to LYRA files.
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VERSION UPDATE
To receive the latest version of LYRA return your original disk. #UP162 . . . . **$10.00**

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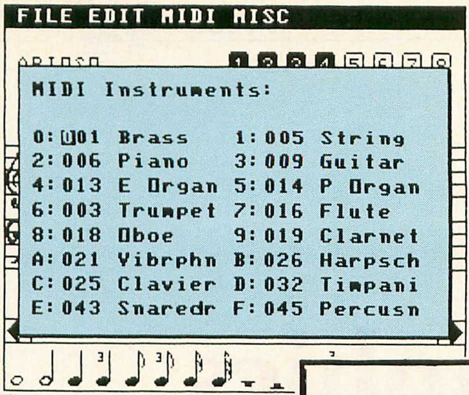

```
MIDI Instruments:

0:001 Brass     1:005 String
2:006 Piano     3:009 Guitar
4:013 E Organ   5:014 P Organ
6:003 Trumpet   7:016 Flute
8:018 Oboe      9:019 Clarnet
A:021 Vibrphn   B:026 Harpsch
C:025 Clavier   D:032 Timpani
E:043 Snaredr   F:045 Percusn
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Introducing

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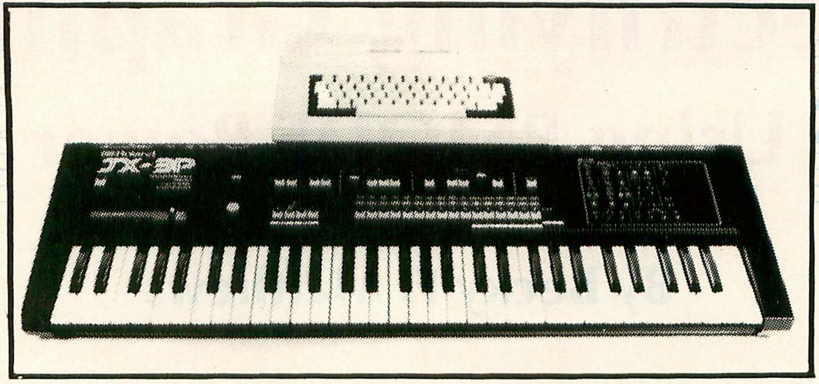

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- ✓ LYRA editing. (one voice per track).
- ✓ Playback from any number of tracks.
- ✓ Quantizing to 1/16, 1/32, 1/64 intervals.
- ✓ Dynamic memory allocation.
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  - Program change
  - Pitch wheel
  - Control Change
  - Channel Pressure
  - System Message
- ✓ Graphic Piano Keyboard Display in both record and playback mode.
- ✓ Adjustable Key (Transposition) for each track.
- ✓ Save recording to disk for later playback or editing.
- ✓ Syncs to drum machine as MASTER or SLAVE.
- ✓ PUNCH IN and PUNCH OUT editing.
- ✓ Sequencer features.
- ✓ 100% machine code.
- ✓ "Musician Friendly" Menu Driven.
- ✓ Metronome
- ✓ Many songs included.

Includes MIDI hardware interface, 2 MIDI cables, detailed manual, and software. Requires 64K CoCo, Y-Cable or Multi-Pak.

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TRIPLE Y-CABLE #TY173	**$34.95**

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Save and load voice parameters for the Yamaha DX series of synthesizers (DX-7, DX-100, DX-21 etc.). Save sounds individually or as a group letting you load the entire synthesizer in seconds. Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.

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CASIO LIBRARIAN

Save and load voice parameters for any Casio synthesizer (CZ-101, CZ-1000, CZ-5000 etc.) You can save from the: presets, cartridge, memory or buffer. Requires COCO MIDI hardware interface.

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MUSICA MIDI™

MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Inlcudes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.

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If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. MIDI KEYBOARD when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.

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Electrifying Graphics
Using PMODE Power

By Becky F. Matthews

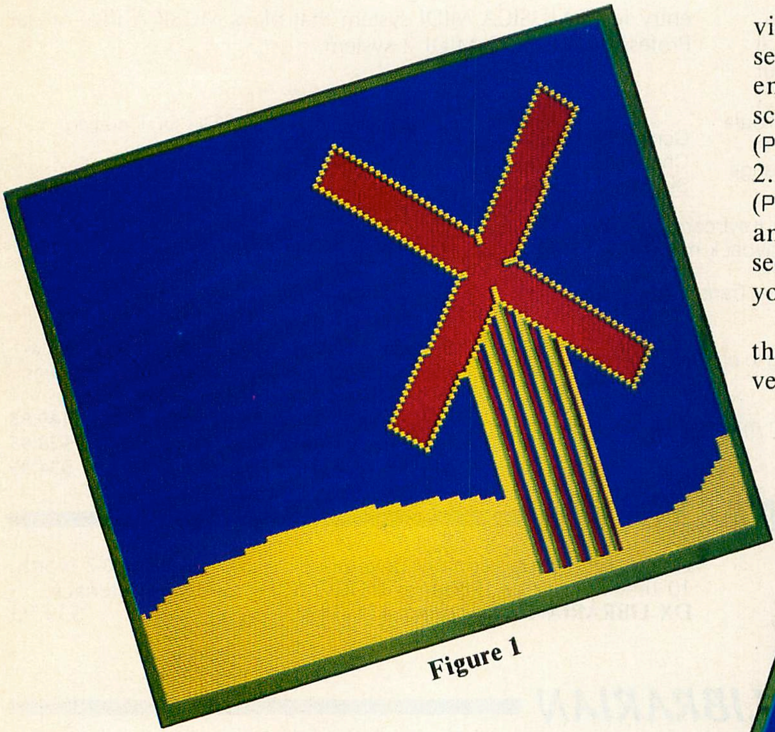
Figure 1

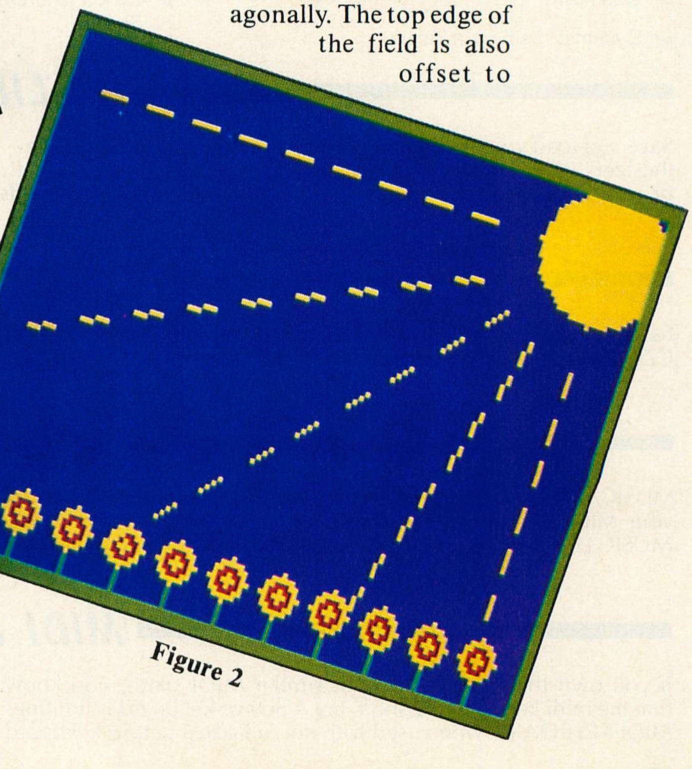
Figure 2

There is nothing like a colorful computer animation to pique a person's interest. Using animation, the most serious subject can become as entertaining as Saturday morning cartoons are to a child. You want to get a point across? Catch someone's eye (and attention) by using lots of color and movement.

Computer animation is easy. *Energy* provides three examples of simple animation sequences illustrating three different sources of energy. Each animation uses two `PMODE1` screens. A picture is drawn on the first screen (`PMODE 1,1`), which uses graphics pages 1 and 2. The second screen for each animation (`PMODE 1,3`) uses graphics pages 3 and 4. The animation is achieved by offsetting on the second screen the portions of the picture that you want to animate.

In the wind power sequence (see Figure 1), the blades of the windmill are horizontal and vertical on the first screen. On the second screen the blades are drawn diagonally. The top edge of the field is also offset to

---

Becky Matthews has a degree in music education from the University of Mississippi. She and her husband, David, have three CoCos and two CoCo cats.

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

RAINBOW
CERTIFICATION
SEAL

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

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look like a field of wheat blowing in the breeze. Line 250 animates the sequence by flipping back and forth between the two pictures.

In the second animation sequence, hydroelectric power, the water wheel paddles and the waves in the river are offset. The illusion of movement at the end of the water wheel is achieved by circles drawn there on the first screen (Line 360) but not on the second screen. The water wheel sequence is animated by Line 530.

The third animation illustrates solar power (see Figure 2). The sun's rays are offset and the flowers are drawn slightly larger on the second screen to show their growth from the sun's energy. This sequence is animated by Line 790.

In each animation, the second picture is drawn on a hidden screen. This is possible by using the `PMODE` statement (`PMODE 1,3` in this example) and not following it with a `SCREEN` command (see lines 190, 460 and 690). The `SCREEN` command displays the screen. Without the `SCREEN` command, that screen is active (that is, you can draw on it), but it is not shown. To see the second screen of the wind power animation being drawn, edit Line 190, inserting `SCREEN 1,0:` after `PMODE 1,3:`. To see the other two second screens as they are drawn, edit lines 460 and 690, inserting `SCREEN 1,1:` after `PMODE 1,3:` in each line.

I hope this simple program has demonstrated how easily you can animate an object. The next time you have a point to make, remember, cartoons can entertain, but they can teach, too!

(Questions about this program may be directed to the author at 3917 Baxter Street, Nashville, TN 37216. Please enclose an SASE when writing for a reply.) ☐

200	186
340	45
490	154
660	94
END	179

The listing: ENERGY

```
10 '***ENERGY BY BECKY MATTHEWS
20 '*TITLE PAGE
30 CLS4:PRINT@75," SOURCES ";:PR
INT@107,"OF ENERGY";
40 PRINT@196,"1. WIND POWER
    ";:PRINT@228,"2. HYDROELECT
RIC POWER ";:PRINT@260,"3. SOLAR
 POWER        ";
50 PRINT@358,"CHOOSE ONE(1-3)";
60 INPUT A
70 ON A GOSUB 90,270,550
80 GOTO30
90 '**WIND POWER SUB
100 '*1ST SCREEN
110 'DRAW WINDMILL
120 PMODE1,1:PCLS3:SCREEN1,0:DRA
W"BM178,76C2S8BH2H2U30R8D30NG2R3
0D8L30NH2D30L8U30NE2L30U8R30NF2B
D8G6D45R20U45H6"
130 'DRAW FIELD
140 DRAW"BM1,192NU14R254U15L2":C
IRCLE(82,180),100,2,.35,.6,.906:
CIRCLE(210,160),42,2,.5,0,.3
150 'PAINT
160 PAINT(178,76),4,2:POKE178,22
:PAINT(178,160),,2:PAINT(5,188),
2,2
170 '*2ND SCREEN
180 'DRAW FIELD
190 PMODE1,3:PCLS3:CIRCLE(82,179
),100,2,.35,.6,.906:CIRCLE(210,1
59),42,2,.5,0,.3:DRAW"S8C2BM1,19
2NU16R254U16L2"
200 'DRAW WINDMILL
210 DRAW"C2S6BM178,68BU2U2E30F8G
30NL2F30G8H30NU2G30H8E30NR2H30E8
F30D2BD16BG13D52R26U52"
220 'PAINT
230 PAINT(178,76),8,6:PAINT(5,18
8),2,2:POKE178,22:PAINT(178,170)
,,6
240 '*ANIMATE
250 FORC=1TO40:PMODE1,1:SCREEN1,
0:FORT=1TO50:NEXTT:PMODE1,3:SCRE
EN1,0:FORT=1TO50:NEXTT:NEXTC
260 RETURN
270 '**HYDROELECTRIC POWER SUB
280 '*1ST SCREEN
290 'DRAW FRAME
300 PMODE1,1:PCLS1:SCREEN1,1:COL
OR6:LINE(1,1)-(256,192),PSET,B
310 'DRAW MOUNTAINS/SKY
320 COLOR7:LINE(0,70)-(3,65),PSE
T:FORX=3TO256STEP5:Y=RND(70)+20:
LINE-(X,Y),PSET:NEXTX:LINE-(256,
65),PSET:PAINT(20,10),6,7
330 'COPY MOUNTAINS/SKY TO 2ND S
CREEN
340 PCOPY1TO3:PCOPY2TO4
350 'DRAW WATER WHEEL
360 COLOR6:FORR=2TO22STEP4:CIRCL
E(140,150),R,7:NEXTR
370 LINE(160,140)-(208,120),PSET
:LINE(150,130)-(196,114),PSET:LI
NE(162,155)-(212,135),PSET
380 CIRCLE(196,130),20,7,1,.7,.9
9:CIRCLE(196,130),20,7,1,0,.2
390 LINE(142,128)-(188,112),PSET
:LINE(152,169)-(208,147),PSET:CO
LOR7:PAINT(140,150),8,7
400 'DRAW RIVER
410 DRAW"BM0,100S8C7ND10R66F2R8F
1R6F2R4F4R2F3F4D4F4R22BM0,120S8R
62F2R4F1R6F4R4F8D5F4D4F4R28U17":
PAINT(5,105),6,7
420 'DRAW WAVES
```

```
430 DRAW"BM15,110C5R5BD4R3BR2R2B
E5R6BF1BR2R6BE3R3BD7R2BE6R4BR8BD
2R2F2BF4BR6F3BF4F4BU8R1F3BF3F2BD
7F3R4BR3R3BU5L3BD9R5"
440 '*2ND SCREEN
450 'DRAW WATER WHEEL
460 PMODE1,3:COLOR6:CIRCLE(196,1
30),20,7,1,.7,.99:CIRCLE(140,150
),22,7:LINE(156,135)-(204,116),P
SET:PAINT(140,150),8,7
470 CIRCLE(196,130),20,7,1,0,.2:
LINE(152,169)-(208,147),PSET:LIN
E(152,162)-(208,140),PSET:LINE(1
60,145)-(210,125),PSET
480 'DRAW RIVER
490 LINE(142,128)-(188,112),PSET
:DRAW"BM0,100S8C7ND10R66F2R4F1R6
F2R6F4R4F3R2F4D4F4R20BM0,120S8R6
0F2R4F1R6F4R4F8D5F4D4F4R30U17":P
AINT(5,105),6,7
500 'DRAW WAVES
510 DRAW"BM20,110C5R6BF2R2BR2R4B
U4R6BF3R8BD5R5BE5R2BF2R4BU6R2BF8
R4F2BE3R4F3BF4R2F2BF4F2BU2F3BD8F
2R2BU4F3R4BD3R3BU9L6"
520 '*ANIMATE
530 FORC=1TO40:PMODE1,1:SCREEN1,
1:FORT=1TO50:NEXTT:PMODE1,3:SCRE
EN1,1:FORT=1TO50:NEXTT:NEXTC
540 RETURN
550 '**SOLAR POWER SUB
560 '*1ST SCREEN
570 'DRAW SUN
580 PMODE1,1:PCLS3:SCREEN1,0:CIR
CLE(235,20),30,2,.9:PAINT(220,20
),2,2:COLOR2
590 'DRAW RAYS
600 FORX=185TO5STEP-20:LINE(X,20
)-(X+10,20),PSET:NEXTX
610 FORY=55TO170STEP17:LINE(235,
Y)-(235,Y+8),PSET:NEXTY
620 Y=45:FORX=206TO80STEP-15:LIN
E(X,Y)-(X-6,Y+6),PSET:Y=Y+15:NEX
TX
630 Y=35:FORX=196TO10STEP-20:LIN
E(X,Y)-(X-10,Y+2),PSET:Y=Y+8:NEX
TX
640 Y=50:FORX=218TO180STEP-5:LIN
E(X,Y)-(X-2,Y+8),PSET:Y=Y+15:NEX
TX
650 'DRAW SMALL FLOWERS
660 COLOR1:FORX=16TO245STEP22:LI
NE(X,190)-(X,180),PSET:CIRCLE(X,
180),7,2:PAINT(X,180),4,2:CIRCLE
(X,180),1,2:NEXTX
670 '*2ND SCREEN
680 'DRAW SUN
690 PMODE1,3:PCLS3:CIRCLE(235,20
),30,2,.9:PAINT(220,20),2,2:COLO
R2
700 'DRAW RAYS
710 FORX=175TO5STEP-20:LINE(X,20
)-(X+10,20),PSET:NEXTX
720 FORY=65TO160STEP17:LINE(235,
Y)-(235,Y+8),PSET:NEXTY
730 Y=50:FORX=201TO80STEP-15:LIN
E(X,Y)-(X-6,Y+6),PSET:Y=Y+15:NEX
TX
740 Y=43:FORX=186TO10STEP-20:LIN
E(X,Y)-(X-10,Y+2),PSET:Y=Y+8:NEX
TX
750 Y=58:FORX=215TO180STEP-5:LIN
E(X,Y)-(X-2,Y+8),PSET:Y=Y+15:NEX
TX
760 'DRAW LARGE FLOWERS
770 COLOR1:FORX=16TO245STEP22:LI
NE(X,190)-(X,175),PSET:CIRCLE(X,
175),8,2:PAINT(X,175),4,2:CIRCLE
(X,175),3,2:NEXTX
780 '*ANIMATE
790 FORC=1TO40:PMODE1,1:SCREEN1,
0:FORT=1TO50:NEXTT:PMODE1,3:SCRE
EN1,0:FORT=1TO50:NEXTT:NEXTC
800 RETURN
```

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Graphics Creation Transfer

By Scott Montgomery

Here is a program that graphics fanatics might find useful. Since graphics screens reside in different memory locations in disk and tape systems, even commercial transfer utilities don't fix your favorite graphics files. Suppose you have a disk-based system (as I do) and your friends have tape-only systems. How do you transfer your graphics creations to tape format for your friends? This is where *Graftran* comes in. It's for PMODE 3 or 4 standard 6K graphics screens.

Graftran is written in Extended Color BASIC and is menu-driven. There are five selections on the menu: load in a tape graphic, load in a disk graphic, view graphic in memory, save graphic to disk and save graphic to tape. These are all straightforward, but I have outlined the various options below.

The first is loading in a tape graphic. Press Play on your cassette player when you have inserted the tape containing the graphic. Press the number 1 on the computer keyboard and press any key except ENTER. If no I/O Error occurs, the graphic will be loaded into memory. If you press ENTER by itself, the load process will be aborted and you will be returned to the main menu.

The next option is loading in a disk graphic. Pressing 2 from the main menu puts you into the disk load routine. If you want to see the directory, enter DIR. Otherwise enter the filename and extension of the graphic you want to load. Pressing ENTER by itself will send you back to the main menu once again.

Next is viewing a graphic in memory. Upon pressing 3, you will be prompted to enter either 3 or 4 for the PMODE in which you want to view the graphic. When you are finished viewing the graphic, pressing ENTER returns you to the menu.

The fourth option is saving a graphic to disk. After selecting this option, you will have to enter the filename and extension of the graphic to be saved. Again, ENTER returns you to the menu.

The last option is saving a graphic to tape. This is the only tricky part. Enter the filename of the graphic you want to save. If a disk controller is connected to your computer, you will be informed that the resulting tape copy of the graphic will not be compatible with tape-only systems. To make it tape-only compatible, you must have a tape copy of *Graftran* to load into your tape-only system. All you have to do is disconnect the disk controller, load in and run *Graftran* from tape, select 1, load in the tape copy of the graphic and select 5 to save it back again. *Graftran* will do the rest. The resulting copy of the graphic image will be saved at the correct addresses for a tape-only system. I'd like to thank Andy Kluck for his tape load routine which appeared in the October 1984 RAINBOW.

(Questions or comments may be addressed to the author at 600 Polley Drive, Seymour, IN 47274. Please enclose an SASE for a reply.) ☐

Scott Montgomery of Seymour, Indiana, has a certificate in electronics from the Cleveland Institute of Electronics and is completing an associate's degree in electronics at Indiana Vocational Technical College. He, his wife, Cyndi, and daughters Cheri and Sara, are all confirmed CoCo maniacs.

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130 56
410 185
END 91

The listing: GRAFTRAN

```
10 CLS:A$=STRING$(32,"*"):PRINTA
$;"* GRAPHICS TRANSFER UTILITY #
2 ** (C) 1987 MONTGOMERY SOFTWAR
E *";A$;
20 PRINT" PLEASE SELECT A NUMBER
 (1-5)":PRINT
30 PRINT"(1) LOAD A TAPE GRAPHIC
S FILE":PRINT
40 PRINT"(2) LOAD A DISK GRAPHIC
S FILE":PRINT
50 PRINT"(3) VIEW GRAPHICS IN ME
MORY":PRINT
60 PRINT"(4) SAVE A GRAPHICS FIL
E TO DISK"
70 PRINT"(5) SAVE A GRAPHICS FIL
E TO TAPE";
80 X$=INKEY$: X=VAL(X$):IF X<1 O
R X>5 THEN 80
90 ON X GOTO 100,200,300,400,500
100 REM ANDY KLUCK'S TAPE LOAD
        ROUTINE FROM 10/84
        RAINBOW ARTICLE.
110 CLS:PRINTA$;:PRINT"*PRESS AN
Y KEY TO LOAD GRAPHICS** OR <ENT
ER> TO RETURN TO MENU *";A$
115 L$=INKEY$:IF L$=""THEN 115 E
LSE IF L$=CHR$(13) THEN 10
117 PRINT:PRINT"LOADING GRAPHICS
......"
120 POKE&H78,0
130 POKE&H1D1,0
140 EXEC&HA648
150 POKE&H1E7,PEEK(&HBC):POKE&H1
E8,0
160 EXEC&HA505
170 GOTO 10
200 CLS:PRINTA$;:PRINT"* NAME OF
 DISK GRAPHICS FILE TO** LOAD (F
ILENAME/EXT) OR DIR OR**<ENTER>
TO RETURN TO MAIN MENU*";A$
210 PRINT"> ";:LINEINPUTF$:IF F$
="DIR"THEN CLS:DIR:PRINT:LINEINP
UT"FILENAME TO LOAD (FILENAME/EX
T) > ";F$
220 IF F$="" THEN 10
230 LOADM F$:GOTO 10
300 CLS:PRINTA$;:PRINT"* PMODE 3
 OR 4 GRAPHICS SCREEN?** (PRESS
EITHER NUMBER 3 OR 4) ** PRESS E
NTER WHEN DONE VIEWING*";A$
310 P$=INKEY$:P= VAL(P$):IF P<3
OR P>4 THEN 310
320 PMODE P,1:SCREEN1,1:EXEC4453
9
330 GOTO 10
400 CLS:PRINTA$;:PRINT"* FILENAM
E/EXT TO SAVE TO DISK ** OR <ENT
ER> TO RETURN TO MENU *";A$
410 LINEINPUT"> ";D$
420 IF D$=""THEN 10
430 SAVEM D$,3584,9727,44539
440 GOTO 10
500 CLS:PRINTA$;:PRINT"* FILENAM
E TO SAVE TO TAPE OR  ** <ENTER>
 TO RETURN TO MENU    *";A$:
520 LINEINPUT"> ";R$
522 IF R$=""THEN 10
530 IF PEEK(188)=14 THEN PRINT"T
HE TAPE YOU ARE NOW CREATING   W
ILL NOT BE NON-DISK COMPATIBLE.Y
OU MUST LOAD IN GRAFTRAN ON THET
APE-ONLY SYSTEM AND LOAD IN THEG
RAPHIC ON THIS TAPE AND SAVE ITB
ACK OUT AGAIN TO TAPE."
535 PRINT
540 PRINT"PRESS ANY KEY TO CONTI
NUE"
550 EXEC44539
560 PRINT"SAVING ";R$;" TO TAPE"
570 CSAVEM R$,PEEK(188)*256,PEEK
(188)*256+6143,44539
580 GOTO 10
```

Corrections

"The Kingdom of Le Lutin" (July 1987, Page 58): Some readers have indicated they could not get *Le Lutin* to run on their machines. Upon entering RUN, the computer would lock up. The problem revolves around the high speed poke in Line 1. The high speed poke, POKE 65495,0, will not work on any CoCo revisions earlier than the 'F' board. Just delete POKE65495,0: from that line and *Le Lutin* should work fine.

"CoCo Sets the Pace" (September 1987, Page 140): For those wishing to use *Tachistoscope* on a disk system, three changes are indicated at the bottom of the first column on Page 141. The second change, the one to Line 4030, is unnecessary and, in fact, will not work. Only the changes to Lines 4010 and 4040 should be made. We apologize for any inconvenience this might have caused.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA **at the CoCo SIG> prompt and** INFO **at the TOPIC> prompt.**

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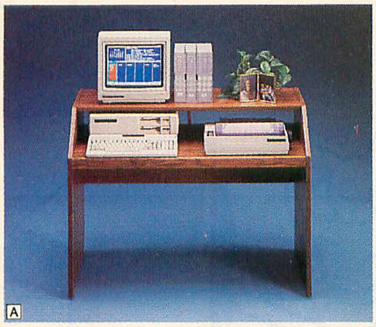
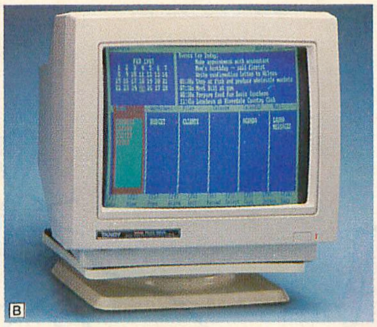

A


B

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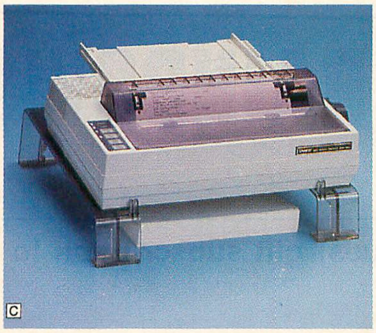
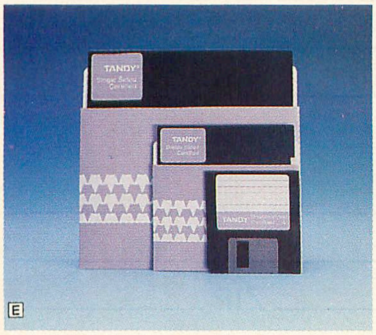
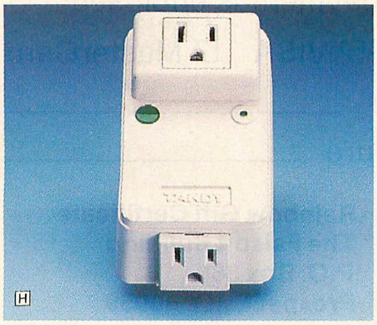

C

D


E

F

G


H

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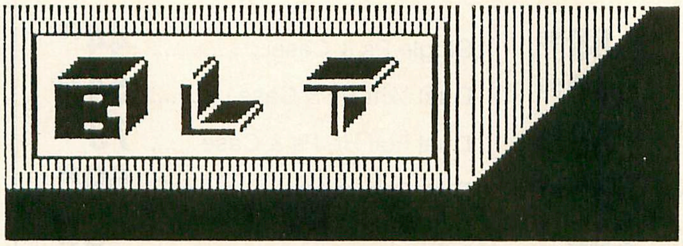
Initially 3-D

By Archor Wright

This program turns your initials into 3-D letters. To enter your initials, press the 1 key and type your first initial; you won't see it yet, so press the 1 key again for your first initial to appear.

To enter your other initials, just press the 2 key, type in your second initial, then press 2 again. Finally, press 3, type in your third initial, and press 3 again.



Now that you have three initials, jazz them up by pressing the zero key. Then the program starts over.

(Questions about this program may be addressed to the author at 1112 N. Keene Road, Clearwater, FL 33515. Please enclose an SASE for a written response.) □

Archor Wright is a junior at Clearwater High School in Florida. He enjoys science and art and is an amateur inventor. In the past, he was a volunteer computer counselor at the Clearwater Library and taught people of all ages how to use the CoCo.

22	251
44	76
65	158
81	6
END	138

The listing: 3DLETTER

```
0 'CREATED BY: ARCHOR WRIGHT
1 PMODE4,1:PCLS:SCREEN1,1:POKE178,1:LINE(0,0)-(115,45),PSET,BF:DRAW"BM116,0;S4C1D45E45":POKE178,1:PAINT(120,0),,1:POKE178,2:LINE(4,4)-(111,41),PSET,BF:LINE(7,7)-(108,38),PRESET,BF:POKE178,3:LINE(9,8)-(107,37),PSET,B
2 A$=INKEY$:IFA$="0"THENPAINT(100,30),1,1:LINE(0,60)-(255,191),PSET,BF:LINE(255,0)-(170,60),PSET,BF:FORT=0TO2555:NEXTT:RUN
3 IFA$="1"THENGOSUB34
4 IFA$="2"THENGOSUB36
5 IFA$="3"THENGOSUB38
6 IFA$="A"THENGOSUB40
7 IFA$="B"THENGOSUB42
8 IFA$="C"THENGOSUB44
9 IFA$="D"THENGOSUB46
```

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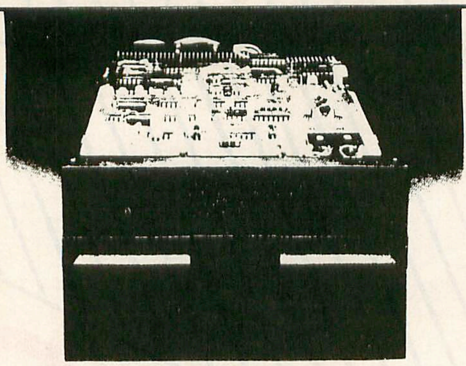

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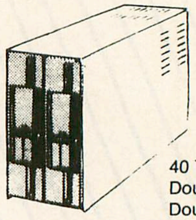

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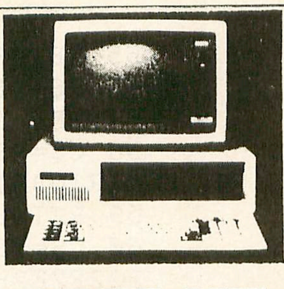

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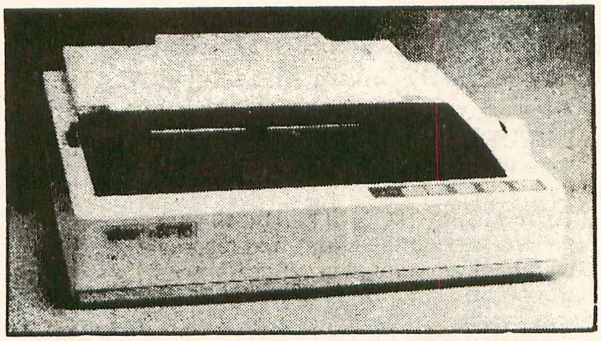

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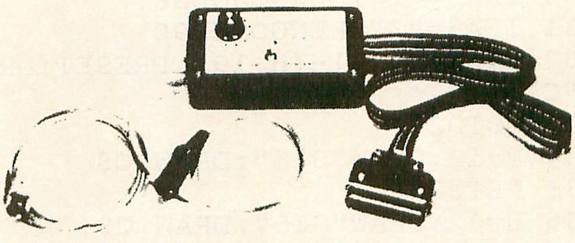

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```
10 IFA$="E"THENGOSUB48
11 IFA$="F"THENGOSUB50
12 IFA$="G"THENGOSUB52
13 IFA$="H"THENGOSUB54
14 IFA$="I"THENGOSUB56
15 IFA$="J"THENGOSUB58
16 IFA$="K"THENGOSUB60
17 IFA$="L"THENGOSUB62
18 IFA$="M"THENGOSUB64
19 IFA$="N"THENGOSUB66
20 IFA$="O"THENGOSUB68
21 IFA$="P"THENGOSUB70
22 IFA$="Q"THENGOSUB72
23 IFA$="R"THENGOSUB74
24 IFA$="S"THENGOSUB76
25 IFA$="T"THENGOSUB78
26 IFA$="U"THENGOSUB80
27 IFA$="V"THENGOSUB82
28 IFA$="W"THENGOSUB84
29 IFA$="X"THENGOSUB86
30 IFA$="Y"THENGOSUB88
31 IFA$="Z"THENGOSUB90
32 LINE(H,19)-(H,19),PRESET:DRAW
"C1"
33 GOTO2
34 H=12:DRAW"S15":DRAW C$
35 RETURN
36 H=42:DRAW"S15":DRAW C$
37 RETURN
38 H=74:DRAW"S15":DRAW C$
39 RETURN
40 C$="R5D4L2U2L1BU1R1L1BD1D2E1G
1L2U4E2R5G2E2D4G2
41 RETURN
42 C$="R5D2L1BL1BU1L1R1BD2L1R1BU
1BR1R1D2L5U4E2R5G2E2D4G2
43 RETURN
44 C$="BR1G1E1R4D1L3D2R3D1L4H1U2
E3R4G2E2D1G2BG2BL1E2BR1R2G2E2D1G
2
45 RETURN
46 C$="BD1R4F1D2L3BU1R1U1L1D1BD1
L2U3R4E2F1G2E2D2G2E2U2H1L4G2
47 RETURN
48 C$="BR1R4D1L3D1E1G1R3D1L3D1E1
G1R3D1L4U4E2R4G2E2D1G2E2BD1L1R1G
2E2D1G2E2BD1L1R1G2E2D1G2
49 RETURN
50 C$="R5D1L3D1E1G1R3D1L3D2E2G2L
2U4E2R5G2E2D1G2E2BD1L1R1G2E2D1G2
51 RETURN
52 C$="R5D1L4D2R3H1R2D2L5U4R5L5E
2R5G2E2D1G2L4D2E2G2BR2BU1E1G1BR2
E2L1R1D2G2
53 RETURN
54 C$="BR1U1R1D2R2U2R1D5L1U2L2D2
L1U5E1R1G1E1D2G1E1R1U1E1R1G1E1D5
G1BL3E2
55 RETURN
56 C$="BR2R2D4L2U4E2R2G2E2D4G2
57 RETURN
58 C$="BR4R1D4L3U2E2R1L1G2R1E1G1
D1R1U3R1L1E2R1G2E2D4G2
59 RETURN
60 C$="E2R2D1U1G2L2R2D1E3R2G2L2R
2G2F2E2H2F2G2L2H1D1L2U4
61 RETURN
62 C$="BR1E2R1G2L1R1D3E2U3D3R3L3
G2R3E2D1G2U1D1L4U4R1
63 RETURN
64 C$="BR1R1F1E1R1D4L1U3G1H1D3E2
G2L1U4E2R1G2E2F1G1E2R1G2E2D4G2
65 RETURN
66 C$="BR1R1F2U2R1D4L1H2D2E1G1L1
U4E2R1G2E2F1E1G2E2R1G2E2D4G2
67 RETURN
68 C$="BR1R4D4L2BU1R1U2L2D2E2G2R
1BD1L2U4E2R4G2E2D4G2
69 RETURN
70 C$="BR1R4D2L2BU1L1R1BD1L1D2L2
U4R5L5E2R5G2E2D2G2L1G2
71 RETURN
72 C$="BR1R4D3H1F2E2H1F1G2D1E2U1
D1G2H2U2L2D2E2G2R2F1L4U4R4L4E2R4
G2E2D4G2
73 RETURN
74 C$="BR1BD1BR1R1L1BL1BU1E2R3G2
L3R3D2E2U2D2G2L1F2E2H1U1D1F1G2L2
H2D2E1G1L1U4R1L1
75 RETURN
76 C$="BR1BU1R4D1L3D1E1G1R3E1L1R
1D3G1U3D3L4U1E1G1R3U1L3U3E1R4G1E
1D1G1
77 RETURN
78 C$="R5D1L2D3E2U1D1G2L1U3L2U1E
2R5G2E2D1G2E2
79 RETURN
80 C$="BR1R1D3E1G1R1U3E2R1D4G2E2
U4G2L1R1D4L3U4E2R1G2E2D1
81 RETURN
82 C$="BR1BD1R1F2E4R1D1G4L1R1E4U
1G2L1R1G3H3E2R1G2E2F2
83 RETURN
84 C$="R1D2R1U1E1R1L1G1R1E1G1D1R
1U2E2R1G2L1R1D4E2U4D4G2L2U1D1L2U
4E2R1G2E2D2
85 RETURN
86 C$="R2F1E1R2G2F2E2H2F2G2L2H1G
1L2E2H2E2R2G2E2F1E1G2E2R2G2
87 RETURN
88 C$="BR1R1F2E2R1G2D2E2U2D2G2L2
U2H2E2R1G2E2F2E2R1G2
89 RETURN
90 C$="BD1R5G2R3E2L3R3D1G2E2U1G2
D1L5E2L3U1E2R5G2
91 RETURN
```

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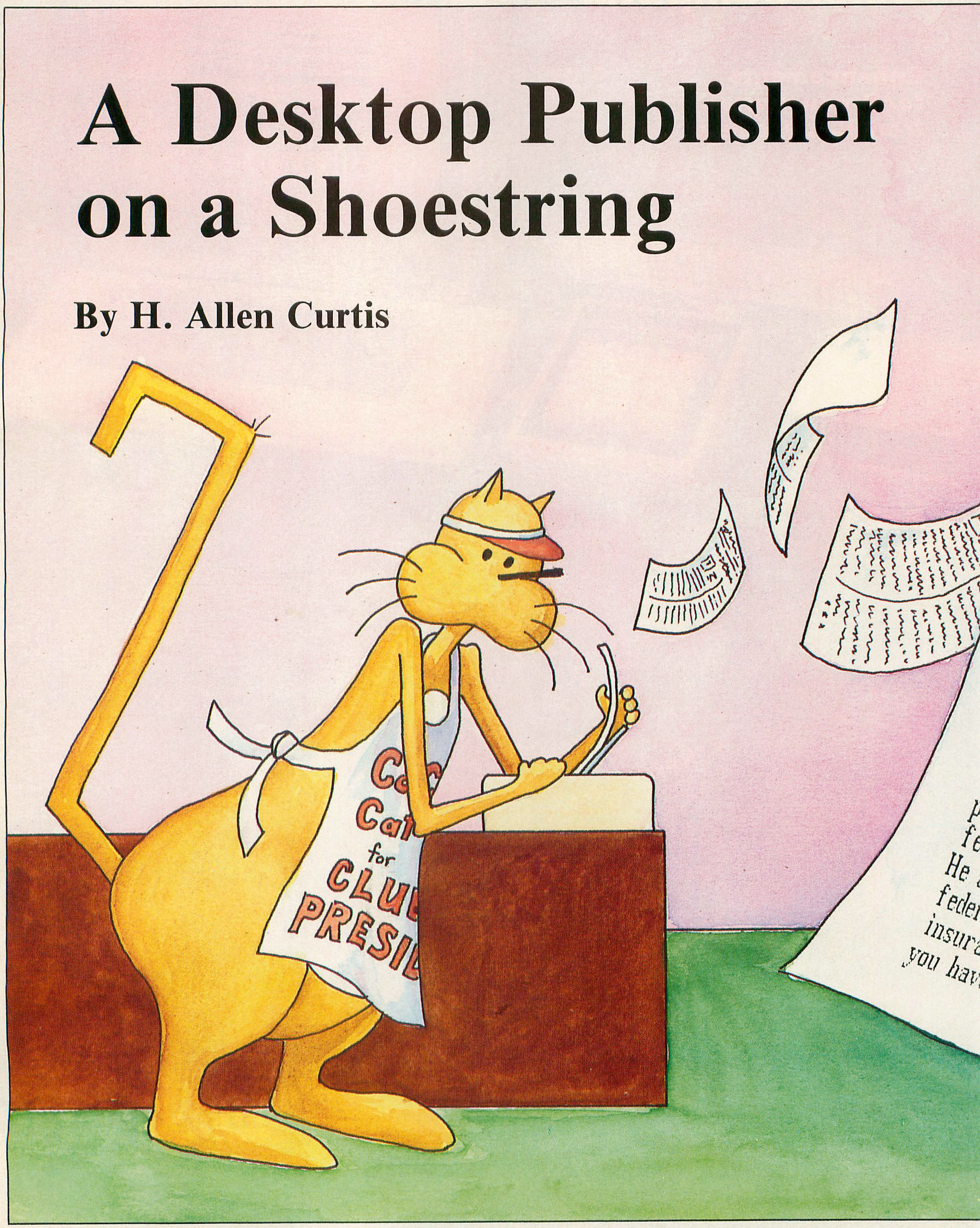
By H. Allen Curtis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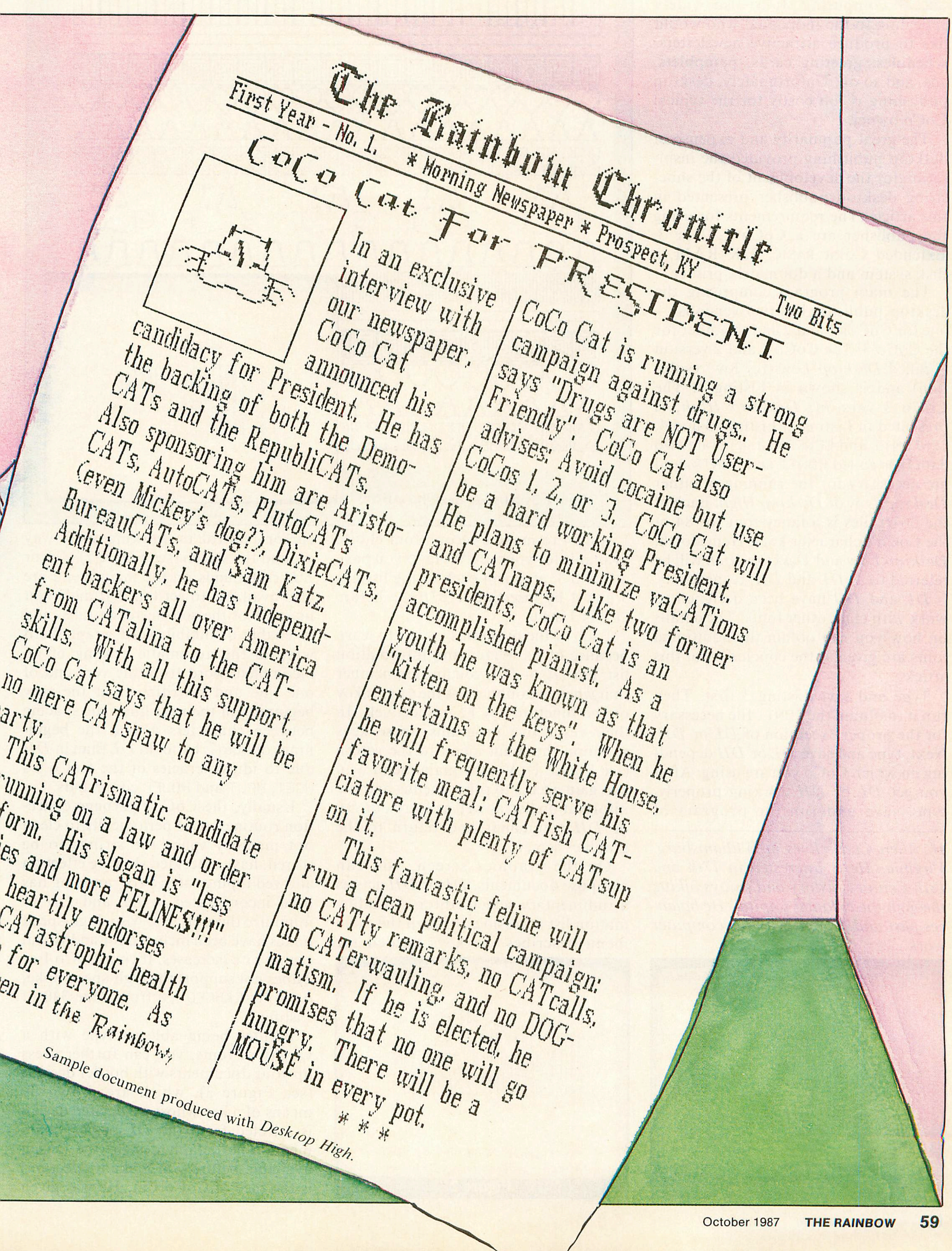

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First Year - No. 1. * Morning Newspaper * Prospect, KY Two Bits

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CoCo Cat is running a strong campaign against drugs. He says "Drugs are NOT User-Friendly". CoCo Cat also advises: Avoid cocaine but use CoCos 1, 2, or 3. CoCo Cat will be a hard working President. He plans to minimize vaCATions and CATnaps. Like two former presidents, CoCo Cat is an accomplished pianist. As a youth he was known as that "kitten on the keys". When he entertains at the White House, he will frequently serve his favorite meal: CATfish CAT-ciatore with plenty of CATsup on it.

This fantastic feline will run a clean political campaign: no CATty remarks, no CATcalls, no CATerwauling, and no DOG-matism. If he is elected, he promises that no one will go hungry. There will be a MOUSE in every pot.

* * *

Sample document produced with *Desktop High.*

Desktop publishing is riding the crest of popularity in business computing. It is also widely appealing to the individual who would like to produce attractive newsletters, schedules, greeting cards, pamphlets, ads, and so on. Unfortunately, desktop publishing is too costly for the typical CoCo owner.

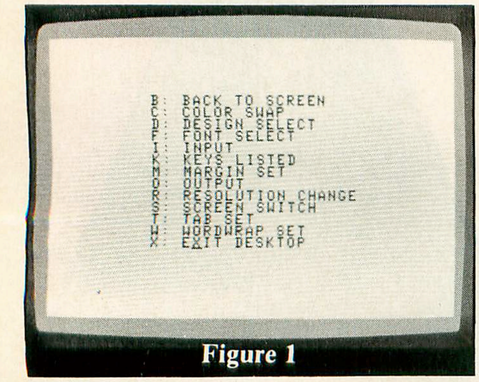
The great popularity and expense of desktop publishing provided the inspiration for the development of the shoestring desktop publisher presented in this article. The requirements for using the publisher are a CoCo 1, 2 or 3, Extended Color BASIC, 32K RAM, a disk system and a dot matrix printer.

The main program comprising the desktop publisher has two versions — one for CoCos 1 and 2 and the other for the CoCo 3. The CoCo 1 and 2 version is called *Desktop Low* (for low resolution) and is shown in Listing 1. The CoCo 3 version, *Desktop High*, is presented in Listing 2. Listings 3 and 4, `GENFONT1` and `GENFONT2` generate two data files called `FONT1` and `FONT2`, and are necessary for the running of either *Desktop Low* or *Desktop High*. Each of the `DATA` files is a fancy font for 84 of the CoCo's character keys. Henceforth, *Desktop Low* and *Desktop High* will be referred to as *DL* and *DH*, respectively.

DL and *DH* have been designed to work with eight other fonts. The details on how you can obtain the additional fonts are given at the conclusion of this article.

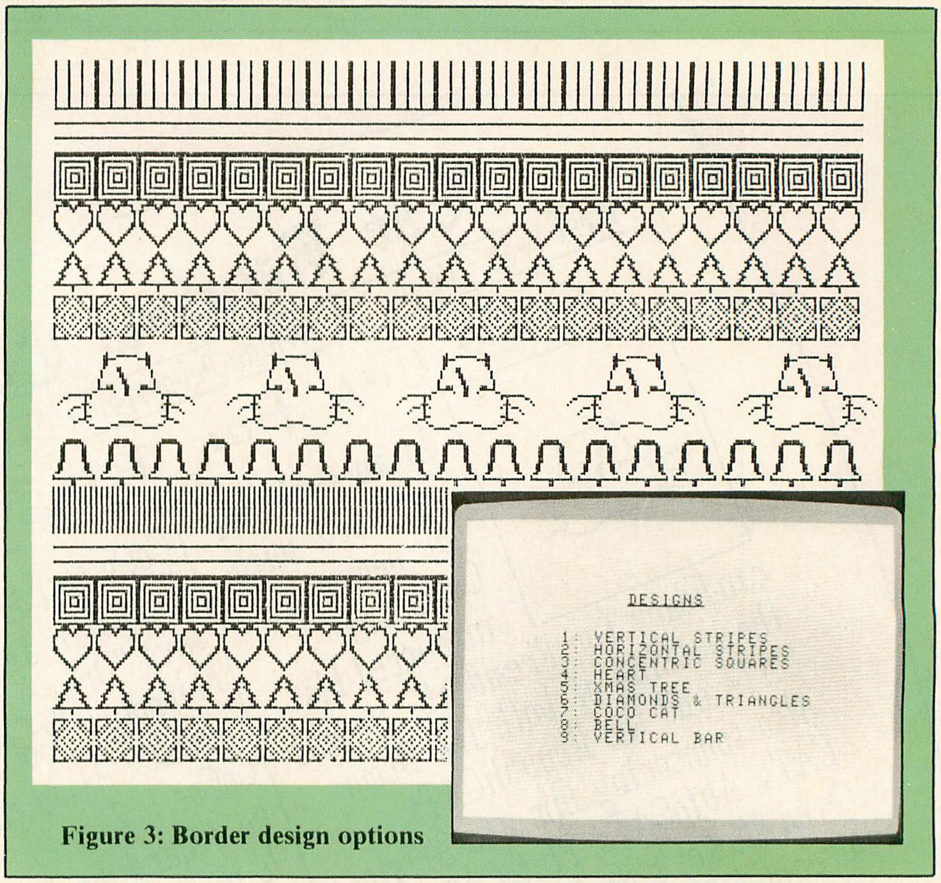
Type and save Listing 3 first. Then run it to obtain the `FONT1` file necessary for the proper execution of *DL* or *DH*. Next, type and save *DL* or *DH* depending on which CoCo you are using. After you get *DL* or *DH* working properly, type, save and run the program of Listing 4 to make a second font choice available for your use. Note: If you have a CoCo 3, augment each of the listings 3 and 4 by inserting `WIDTH32:` before `CLS` in Line 0.

H. Allen Curtis lives in Williamsburg, Virginia. He is interested in 17th and 18th Century history and enjoys biking through the colonial Capital. He balances past and present with his computer work.



```
B: BACK TO SCREEN
C: COLOR SWAP
D: DESIGN SELECT
F: FONT SELECT
I: INPUT
K: KEYS LISTED
M: MARGIN SET
O: OUTPUT
R: RESOLUTION CHANGE
S: SCREEN SWITCH
T: TAB SET
W: WORDWRAP SET
X: EXIT DESKTOP
```

Figure 1



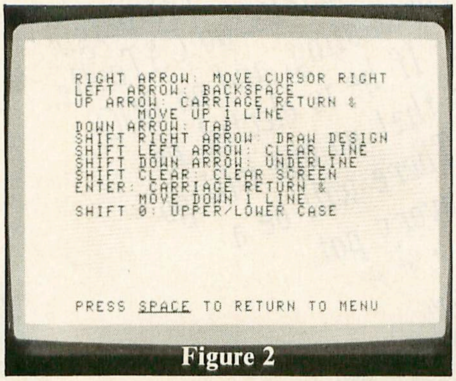
```
                DESIGNS

      1: VERTICAL STRIPES
      2: HORIZONTAL STRIPES
      3: CONCENTRIC SQUARES
      4: HEART
      5: XMAS TREE
      6: DIAMONDS & TRIANGLES
      7: COCO CAT
      8: BELL
      9: VERTICAL BAR
```

Figure 3: Border design options

Each of the programs is easy to learn because of its menus and information list. For *DL* or *DH*, you must remember that when in doubt, press the CLEAR key or the function key F2, respectively. In their respective programs, these keys summon the main menu to the screen (see Figure 1). Via the main menu, you can gain access to other menus and the information list, as well as carry out *DL* or *DH* commands and return to the graphics screen.

On the graphics screen, you can compose documents. *DL* or *DH* acts as a rudimentary screen editor. An information list accessible through the main menu describes the keys needed for cursor control in working your way around the screen (see Figure 2). *DL* or *DH* commands on the main menu are also available to set top, left and right margins of the screen, to set tabs, and to enable or inhibit word wrap. Word wrap is the automatic erasing of an incomplete word from the very end of one line and rewriting it at the very beginning of the next line. The spacing between characters and at the beginnings of lines is better in *DL* than in *DH* due to idiosyncracies of the CoCo 3's `HGET`, `HPUT` and `HBUFF` commands.



```
RIGHT ARROW: MOVE CURSOR RIGHT
LEFT ARROW: BACKSPACE
UP ARROW: CARRIAGE RETURN &
     MOVE UP 1 LINE
DOWN ARROW: TAB
SHIFT RIGHT ARROW: DRAW DESIGN
SHIFT LEFT ARROW: CLEAR LINE
SHIFT DOWN ARROW: UNDERLINE
SHIFT CLEAR: CLEAR SCREEN
ENTER: CARRIAGE RETURN &
     MOVE DOWN 1 LINE
SHIFT 0: UPPER/LOWER CASE




PRESS SPACE TO RETURN TO MENU
```

Figure 2

Usually, the CoCo's garbage collection routines, used periodically to clean out memory space for strings to be stored, have a decided slowing effect on allowed typing rates. Programming has been incorporated in *DL* and *DH* to minimize these effects. Also, high-speed pokes have been included for additional typing rate increases. If your CoCo 1 or 2 does not support the high-speed poke, omit `POKE&HFFD7,0` from Line 340 of Listing 1.

Besides being able to type with a variety of fonts, you can further dress up your documents with border designs (see Figure 3), which are drawn by means of a key whose associated design is selected from the *DL* or *DH* main menu. The default design (the design available before you make a selection) is the face of CoCo Cat. He was given

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This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory. **$59.95**

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Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware. **$59.95**

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ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package. **$59.95**

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this honor in appreciation of the motivation he inspired in the development of CoCo 3 screen mode switching (see "Our Highfalutin' Feline Does a CoCo 3 Fandango," on Page 52, May 1987 issue of THE RAINBOW), which was crucial in the formulation of *DH*.

DH permits the use of a Mode 1 or Mode 3 screen as well as switching back and forth from these two modes. Mode switching allows you to incorporate the large size print and/or border designs of Mode 1 into a Mode 3 screen document with its smaller print and design sizes. The smaller print and designs of Mode 3, when switched to Mode 1, undergo deformation. Fortunately, they regain their pleasing shapes when a switch is made back to Mode 3.

DL employs a `PMODE 4` graphics screen only. However, you are given a choice of either of the available two-color sets of `PMODE 4`. Furthermore, you may swap foreground and background colors, but for proper operation you must clear the screen just before or after making the swap. *DH* allows color swapping, too, and you needn't accompany the swap with a screen clear.

Both *DL* and *DH* provide facilities for saving and loading screens as disk files. In both saving and loading, you must furnish (when prompted) a filename without an extension. In loading, the filename must necessarily be that of a file on the disk in the default drive. The loaded screen may be one that you composed using *DL* or *DH* or a graphics screen derived by the employment of some other program. In the case of a `PMODE 4` screen from another program, it must have been recorded from the video page whose starting and ending addresses are 3584 and 9727, respectively. The use of screens from other programs in *DL* and *DH* permits greater versatility in blending graphics and text in your documents.

The *DH* save and load routines were patterned after the `HISAVE` and `HILOAD` routines developed by Richard Esposito in his "Doctor ASCII" column (January 1987 issue of THE RAINBOW). `HISAVE` and `HILOAD` were designed to work in short programs and long programs but not in medium-sized programs where string location information resides in the memory area from hexadecimal addresses 4000 to 5FFF. *DH* is a program of the latter class. Its save and load routines were adjusted to work properly by the use of "dummy" filenames during the actual loading and saving processes (when the true filename string is lost) and then renaming the files to their true filenames after the string information is once more available. This means that when saving a screen, you must *not* choose a filename of a file already on disk. Otherwise, the `RENAME` command will induce an AE Error.

> ***"You can work on two Mode 1 or Mode 3 screens and switch back and forth between them."***

There is one command noticeably lacking in both *DL* and *DH* — a line print command. To obtain a hard copy of a screen, you must terminate *DL* or *DH* with an exit command, load an appropriate screen dump and run it. If you have a CoCo 1 or 2 but no screen dump program for your particular printer, refer to back issues of THE RAINBOW (see Richard Lack's "Get the Picture With Gemini Screen Print" [May 1985, Page 45] and Mark Sullins' "Picprt: Good Things Come in All Sizes" [May 1986, Page 72]) to remedy the situation. If you have a CoCo 3 and a dot matrix printer I recommend that you use one of the three programs listed in this month's "Screen Dump Extraordinaire" beginning on Page 30. If you are using a printer capable of printing a column of eight dots at each print position as the print head moves across the page, the program called `SCRNDMP` shown in Listing 1 may be used.

There is one innovation included in *DH* worth pointing out for its applicability in other programs. The employment of the innovation doubles the amount of screen memory usable for Mode 1 and Mode 3. The high resolution graphics screen is located in 32K bytes of memory from Hex address 60000 through 67FFF. Each of the Mode 1 and Mode 3 screens uses only the first 16K bytes of this memory area. Line 1 of *DH* installs a short machine language routine that interchanges the contents of the first and last 16K bytes of the screen memory area. You can call for the screen interchange in *DH* by making use of the main menu command `S` (screen switch). Thus, you can work on two Mode 1 or Mode 3 screens and switch back and forth between them. Two such screens correspond to one full, 8½-by-11, printed page when `SCRNDMP` controls the printing. One word of caution: Use of the SHIFT-CLEAR key combination will clear *all* 32K bytes of the screen memory.

`SCRNDMP` was originally designed to handle only the screen at the first 16K bytes of the screen memory area. The following changes in `SCRNDMP` allow it to print each of the two screens in succession.

Change Line 35 to:

```
35 POKEX+145,22:POKEX+146,0:
   POKEX+147,152:Q$="308DFF2
   7EC84C1712608C30202ED8416
   FF11830202ED8417FEED860D1
   6FF4A":FORI=0TO30:T$=LEFT$
   (Q$,2):POKEX+I+300,VAL
   ("&H"+T$):Q$=RIGHT$(Q$,
   LEN(Q$)-2):NEXT
```

Change Line 370 to:

```
370 'SAVEM"SCRNDMP2",&H1200
    ,&H13 4A,X+73
```

Editor's Note: The font menu (see Figure 4) of DL or DH *provides small samples of each of 10 different fonts. However, due to space limitations, only the files which generate fonts 1 and 2 are listed in the magazine, therefore, you will only be able to choose between fonts 1 and 2. Selection of any other font or pressing a non-number key will result in a beep sound and a return to the graphics screen.*

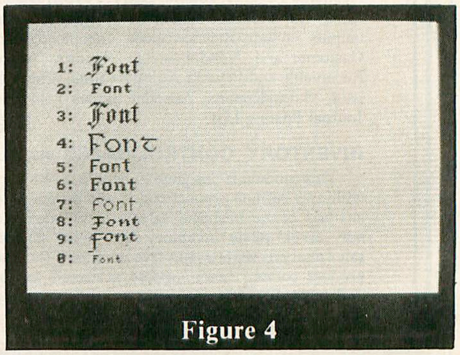


Figure 4

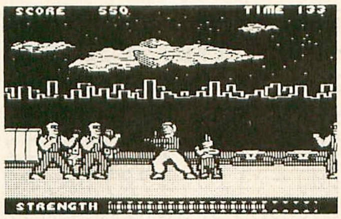
The additional eight font files, `FONT3` *through* `FONT9` *and* `FONT0`*, may be obtained by ordering them from H. Allen Curtis at 172 Dennis Drive, Williamsburg, VA 23185. The complete cost of the disk containing eight font files is $6.50. Please include payment by check or money order.* ☐

60	110	445	74
115	130	510	59
195	102	550	115
250	175	600	16
350	47	END	65
390	148		

Listing 1: DESKTOPL

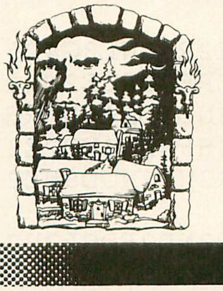
```
0 CLS:PRINT@201,"DESKTOP LOW":PR
INT@262,"BY H. ALLEN CURTIS":PRI
NT@296,"COPYRIGHT 1987":FORI=0TO
500:NEXT
5 CLEAR5000:W=256
10 K$=K$+"C":A1=PEEK(VARPTR(K$)+
2):A2=PEEK(VARPTR(K$)+3):IFA2<2T
HENA2=254:A1=A1-1:GOTO25ELSEA2=A
2-2:GOTO25GOTO25
15 GOSUB440:CLS:PRINT@200,"FILEN
AME: ";:LINEINPUTF$:SAVEMF$+"/LR
",&HE00,&H2600,&HAC73:RETURN
20 GOSUB440:CLS:PRINT@200,"FILEN
AME: ";:LINEINPUTF$:LOADMF$+"/LR
":RETURN
25 L2=1:P=176:D=15:S=8:DIMF$(84)
,M(84),R(500),S(100),F(500),G(20
0):GOSUB565:F$(0)=D$(7):M(0)=D(7
):PMODE4:PCLS1:COLOR0,1:C2=1
30 GET(0,0)-(1,D),S
35 GET(18,20)-(113,170),R,G:GET(
18,20)-(113,170),F,G:K$="1":GOTO
310
40 PCLS:T=V:L=U
45 IF(Q=0 OR Z=U) AND L+4>W-1THE
NL=U:IFT<P THENT=T+D+1
50 IFQ=1 AND Z<>U AND L+4>W-1THE
NGOSUB175
55 GET(L,T)-(L+1,T+D),S:LINE(L,T
)-(L+1,T+D),PSET,BF
60 POKE&H23,A1:POKE&H24,A2
65 K$=INKEY$:IFK$=""THEN65
70 K=ASC(K$):IFK>64 AND K<91THEN
N=K-64:B=N:LINE(L,T)-(L+1,T+D),P
RESET,BF:GOTO160
75 IFK>96 AND K<123THENN=K-96:B=
N+26:LINE(L,T)-(L+1,T+D),PRESET,
BF:GOTO160
80 IFK>47 AND K<58THENN=K-47:B=N
+52:LINE(L,T)-(L+1,T+D),PRESET,B
F:GOTO160
85 IFK>32 AND K<48THENN=K-32:B=N
+62:LINE(L,T)-(L+1,T+D),PRESET,B
F:GOTO160
```

SUNDOG SYSTEMS



Kung-Fu Dude

An exciting new arcade game by Glen Dahlgren. This is the long-awaited response to the huge demand for a Kung-Fu program for the Coco. The graphics and sound effects are spectacular. The action and animation will please even the most die-hard arcade enthusiast. Destroy your opponents and evade obstacles with over ten different moves as you grow ever closer to your ultimate objective. This is the BEST karate game ever available for the color computer. Req. 64K, disk drive, and joystick. Introductory price: only $24.95.



WHITE FIRE OF ETERNITY. Enter the age of monsters, magic, and adventure. Here you will search for the legendary power of White Fire throughout the Forbidden Wood and dark caverns of the Mount. The Rainbow review of 12/86 says, "Visually, White Fire is quite an achievement. The graphics are excellent!" Discover what adventuring on the Coco is all about. Req. 64K and disk drive. Only $19.95.

CHAMPION. Become a superhero in your fight to rid the world of the evil forces of Mr. Bigg in this action adventure. The combat is hot and heavy and requires a fast joystick. The graphics and sound effects are sensational. "This is a fascinating game and a difficult one to master. You'll get a blast out of (Champion)!" says the Rainbow review of 5/87. Defend the innocent and defeat the villainous; be a true Champion! Req. 64K, disk drive, and joystick. Only $19.95.

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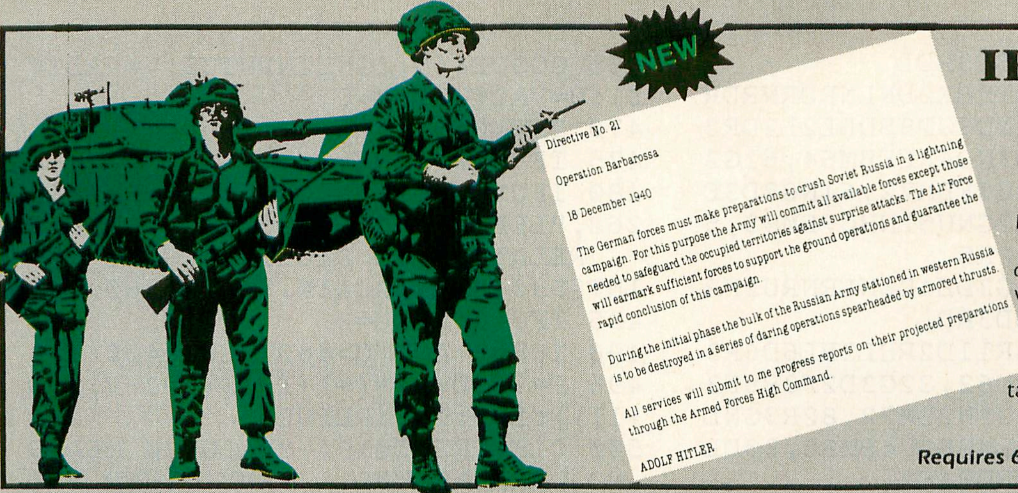
```
90 IFK>57 AND K<65THENN=K-57:B=N
+77:LINE(L,T)-(L+1,T+D),PRESET,B
F:GOTO160
95 IFK=32THENZ=L+S:IFL+8<W THENL
INE(L,T)-(L+7,T+D),PRESET,BF:L=L
+S:GOTO45ELSELINE(L,T)-(L+1,T+D)
,PRESET,BF:L=U:T=T+1+D:GOTO45
100 IFK=13THENPUT(L,T)-(L+1,T+D)
,S:L=U
105 IFK=13 AND T<P THENT=T+1+D:G
OTO45
110 IFK=8 AND L>1THENLINE(L,T)-(
L+1,T+D),PRESET,BF:L=L-2:GOTO45
115 IFK=93THENB=0:LINE(L,T)-(L+1
,T+D),PRESET,BF:GOTO160
120 IFK=94THENPUT(L,T)-(L+1,T+D)
,S:L=U:IFT>D THENT=T-1-D:GOTO45
125 IFK=91THENZ=U:PUT(L,T)-(L+1,
T+D),S:DRAW"BM"+STR$(L)+","+STR$
(T+1+INT(.75*D))+"R3":L=L+4:IFL>
W-5THENL=L-4
130 IFK=9 AND L+4<W THENPUT(L,T)
-(L+1,T+D),S:L=L+4:GOTO45
135 IFK=92THEN40
140 IFK=12THENPUT(L,T)-(L+1,T+D)
,S:GOTO200
145 IFK=10THENPUT(L,T)-(L+1,T+D)
,S:IFT3=0THENT3=1:L=T1 ELSEIFT3=
1THENT3=0:L=T2
150 IFK=21THENPUT(U,T)-(W-1,T+D)
,R,PSET:L=U:GOTO45
155 GOTO45
160 IFL+M(B)<W THENGOSUB195:L=L+
2+M(B):IFL>W-1THENL2=L-W+1:L=W-1
:GOTO45ELSE45
165 IFQ=0 OR Z=U THENL=U:IFT<P T
HENT=T+D+1:GOTO70ELSE70
170 GOSUB175:GOTO70
175 Z1=2*INT(.5*Z):Z=Z1
180 GET(Z,T)-(L,T+D),G,G:PUT(Z,T
)-(L,T+D),R,PSET:L1=L-Z:L=U:Z=U:
IFT<P THENT=T+D+1
185 IFL+L1<0THENL1=L1+2:GOTO185
190 PUT(L,T)-(L+L1,T+D),G,PSET:L
=L+L1+L2:L=2*INT(.5*L+.5):L2=0:R
ETURN
195 DRAW"BM"+STR$(L)+","+STR$(T)
+F$(B):RETURN
200 CLS:PRINT@40,"B: BACK TO SCR
EEN":PRINT@72,"C: COLOR SWAP":PR
INT@104,"D: DESIGN SELECT":PRINT
@136,"F: FONT SELECT":PRINT@168,
"I: INPUT":PRINT@200,"K: KEYS LI
STED":PRINT@232,"M: MARGIN SPECI
FY":PRINT@264,"O: OUTPUT
205 PRINT@296,"S: SWITCH COLOR S
ET":PRINT@328,"T: TAB SET":PRINT
@360,"W: WORDWRAP SET":PRINT@392
,"X: EXIT DESKTOP":POKE&H23,A1:P
OKE&24,A2:POKE&HFFD6,0
210 K$=INKEY$:IFK$=""THEN210
215 IFK$="D" OR K$="d"THENGOSUB6
15:GOTO200
220 IFK$="F" OR K$="f"THEN285
225 IFK$="C" OR K$="c"THENC3=C2:
C2=C1:C1=C3:COLORC1,C2:GOTO200
230 IFK$="I" OR K$="i"THENGOSUB2
0:GOTO200
235 IFK$="K" OR K$="k"THENGOSUB5
40:GOTO200
240 IFK$="O" OR K$="o"THENGOSUB1
5:GOTO200
245 IFK$="M" OR K$="m"THENGOSUB4
55:GOTO200
250 IFK$="B" OR K$="b"THEN280
255 IFK$="T" OR K$="t"THENGOSUB5
25:GOTO200
260 IFK$="X" OR K$="x"THENEND
265 IFK$="S" OR K$="s"THENC=ABS(
C-1):GOTO200
270 IFK$="W" OR K$="w"THENGOSUB5
00:GOTO200
275 SOUND60,5:SOUND60,3:GOTO200
280 SCREEN1,C:GOTO340
285 GOSUB345
290 POKE&H23,A1:POKE&H24,A2
295 K$=INKEY$:IFK$="" THEN295
300 IFK$<"1" OR K$>"2" THENSOUND
60,10:GOTO295
305 GOSUB440
310 GOSUB450
315 OPEN"I",#1,"FONT"+K$
320 FORI=1TO84:LINEINPUT#1,F$(I)
:NEXT
325 FORI=1TO84:INPUT#1,M(I):NEXT
330 INPUT#1,D,S:CLOSE#1
335 PUT(18,20)-(113,170),F,PSET
340 SCREEN1,C:GOSUB495:GET(L,T)-
(L+1,T+D),S:POKE&HFFD7,0:GOTO45
345 SCREEN1,C:GET(18,20)-(113,17
0),F,G:PUT(18,20)-(113,170),R,PS
ET:DRAW"BM25,28NGD6NL2RNR2U6BM32
,29RDLBD3RDL
350 DRAW"BM50,24G3ERE2R4GNL3G4D5
EU4BR2D5G4UH2LG2ER3FERE2URUE2NFG
2U4E4F2DH2DFBM64,29G2ND4LD4NHFRE
2NU5RU4FBM72,29G2RD4NHFNEU4NU2E3
ND6FNFD6E2BM83,25G3LR3NR2NUD8NE2
H2RU5
355 DRAW"BM24,43NGNDR3ND2FDGL2NG
2DG2R5ULBM32,44RDLBD3RDL
360 DRAW"BM49,43R6NDNGL5D3NR3D3N
LR2HU4BM59,45ND3GD2FR3NU3EU2HL2B
M66,45D4RU4R3D4RU3BM76,43ND5G2NR
4FD2FRE
365 DRAW"BM24,62NGNDR3ND5FDGNL2F
```



Directive No. 21

Operation Barbarossa

18 December 1940

The German forces must make preparations to crush Soviet Russia in a lightning campaign. For this purpose the Army will commit all available forces except those needed to safeguard the occupied territories against surprise attacks. The Air Force will earmark sufficient forces to support the ground operations and guarantee the rapid conclusion of this campaign.

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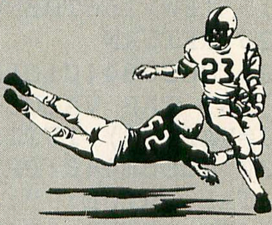

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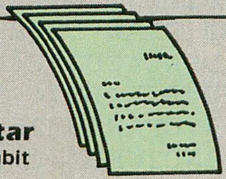
OS-9 Tools



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by Scott Cabit

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```
DGL3ULBM32,63RDLBD3RDL
370 DRAW"BM50,56R5BR2DNLNRDRNRDR
E2BL7L5DLNGBR5G2ND8GD8BDBL2L2DR2
DFNDRURE2U9NE3RD3ND4REFBM64,61G2
ND6LD5LF2RE2NU7RU6FBM72,61NG2D3E
3DRFLD7NE2HNU6BL2GNU5LNHU7BM83,5
7G2RD11NE2H2RU8L2R5
375 DRAW"BM26,81G3DE4D6NLRNRU2NR
NL4U4BM32,82RDLBD3RDL
380 DRAW"BM46,78R11D2RHL2BL6D6R3
D2ENRHL3D6GU13LBM62,82G3D2F3R5E3
U2H3L4G3D2F3R3E3U2H2BM72,82R3GNL
D7RU5NU2E3R2DRD7LNUE2U4BM88,80DL
GR7NR5G5UNE2FDRDRDR4E2
385 DRAW"BM23,98NR5D2EDR3ND3FD2G
L3ULBM32,99RDLBD3RDL
390 DRAW"BM48,96NR6D8RU4NU3R3BM5
6,99ND4GD3FR4NU5EU3HL3BM64,99D5R
U5R4D5U4BM74,96D7FRHU5NL3NR2U2
395 DRAW"BM25,110NR2G2D3FR3NU2EU
HL3ND2UEBM32,111RDLBD3RDL
400 DRAW"BM48,109R7NDL6D8NLR2HU3
NU3R3NUDBM58,112ND4GD3FR4NU4EU3H
L3BM66,112RD5NLR2HU3ER3D5NLR2HU3
BM79,109D8REBL3U4NR3NL2U2
405 DRAW"BM23,124NDNFR5D2HDG2D2R
U2EBM32,125RDLBD3RDL
410 DRAW"BM52,123R4NFL4G2D2NR3D4
BM60,125G2D2F2R2E2U2H2LBM68,125N
D6FER2F2D4BM78,123DND7GR4
415 DRAW"BM24,136ND5GDFGDFR3NU5E
UHNL2EUHL2BM32,137RDLBD3RDL
420 DRAW"BM50,136NGR3NR4D4L2NGR3
NU3NR2D2HD2GL3BM62,138G2DED2R3E2
UGU2L2BM70,138NGD4RUNU3E3RD4RNEU
3BM81,136D6R2NEL2HU4GR4
425 DRAW"BM24,149ND2GDFR3DG2NLRE
2U3HND2L2BM32,150RDLBD3RDLBM50,1
48NG3NR7ND3FD3NR4L3NGR3ND7LD8GL3
BM60,148G3NRF2NU3R3E2NU2LU3L2BM6
8,148G2RD3RU2NU2E3RD5RNE2U4BM79,
147NG2D2NR2ND3LD3FR2E2
430 DRAW"BM24,163ND5GD4FR3U5G2DE
3ND4HL2BM32,164RDLBD3RDLBM50,164
NR3D2NR2D3BM56,166GDFREUHBM61,16
6D2NDE2FD2BM68,164D2NLNRD2FE
435 RETURN
440 POKE&H23,A1-1:POKE&H24,A2:RE
TURN
445 POKE&H23,A1-2:POKE&H24,A2:RE
TURN
450 POKE&H23,A1-3:POKE&H24,A2:RE
TURN
455 GOSUB440:CLS:PRINT@129,"ENTE
R TOP MARGIN (0 - 10): ";:LINEIN
PUTV$
460 PRINT@193,"ENTER LEFT MARGIN
 (0-200):       ":PRINT@220,"";
```

```
465 GOSUB445:LINEINPUTU$:V=VAL(V
$):U=VAL(U$):Z=U
470 IFV<0THENV=0
475 IFV>10THENV=10
480 IFU>W-50THENSOUND60,3:PRINT@
262,"LEFT MARGIN TOO BIG":PRINT"
   RELATIVE TO RIGHT MARGIN!":PR
INT@330,"TRY AGAIN.":GOTO460
485 IFU<0THENU=0
490 IFH=3 AND U>400THENU=400
495 P=V+(D+1)*(-1+INT((192-V)/(D
+1))):L=U:T=V:RETURN
500 CLS:PRINT@194,"VALUE 0 MEANS
 NO WRAP-AROUND.   ANY OTHER VAL
UE SPECIFIES      THE RIGHT MAR
GIN."
505 GOSUB440:PRINT@290,"ENTER VA
LUE (50 TO 256):     ";:PRINT@31
6,"";:LINEINPUTW$:IFVAL(W$)=0THE
NQ=0:RETURN
510 Q=1:W=VAL(W$):IFW<U+50THENSO
UND60,3:PRINT@356,"RIGHT MARGIN
TOO SMALL          RELATIVE TO L
EFT MARGIN.":PRINT@425,"TRY AGAI
N.":GOTO505
515 IFW>256THENW=256
520 RETURN
525 GOSUB440:CLS:PRINT@130,"ENTE
R 1ST TAB VALUE: ";:LINEINPUTT$:
T1=VAL(T$):IFT1>256THENT1=256
530 GOSUB440:PRINT@194,"ENTER 2N
D TAB VALUE: ";:LINEINPUTT$:T2=V
AL(T$):IFT2>256THENT2=256
535 RETURN
540 CLS:PRINT@33,"RIGHT ARROW: M
OVE CURSOR RIGHT":PRINT@65,"LEFT
 ARROW: BACKSPACE":PRINT@97,"UP
ARROW: CARRIAGE RETURN &":PRINT@
139,"MOVE UP 1 LINE":PRINT@161,"
DOWN ARROW: TAB"
545 PRINT@193,"SHIFT RIGHT ARROW
: DRAW DESIGN":PRINT@225,"SHIFT
LEFT ARROW: CLEAR LINE":PRINT@25
7,"SHIFT DOWN ARROW: UNDERLINE":
PRINT@289,"SHIFT CLEAR: CLEAR SC
REEN
550 PRINT@321,"ENTER: CARRIAGE R
ETURN &":PRINT@363,"MOVE DOWN 1
LINE":PRINT@385,"SHIFT 0: UPPER/
LOWER CASE
555 PRINT@481,"PRESS SPACE TO RE
TURN TO MENU";
560 K$=INKEY$:IFK$=""THEN560ELSE
RETURN
565 D(1)=14:D$(1)="D15BR5U15BR5D
15BR5U15
570 D(2)=14:D$(2)="R15BD5L15BD5R
15BD5L15
```

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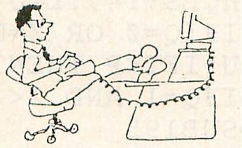

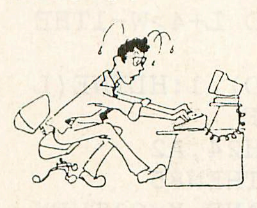

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```
575 D(3)=14:D$(3)="R15D15L15U14B
R2BDR11D11L11U10BR2BDR7D7L7U6BR2
BDR3D3L3U2
580 D(4)=14:D$(4)="BR3G2NUDLD5NF
7EDF6NE6RE6NHU5LU2LNL3HL2G2NRNH2
DH3DL
585 D(5)=14:D$(5)="BR7BDG3RNE2DG
3RNE3DG3RNE3R6ND2R7H3LNF2ENH3RH3
UNHRH2
590 D(6)=14:D$(6)="R5G5NU4BD2E7F
7G7H7BD2D5R5NH4BR4R5U5NG4BU4U5L5
NF4BL2BD3G4F4E4H4BD3GFE
595 D(7)=62:D$(7)="BR31BD4L3GL3N
U2D2GNU4GD2GD3R5NFUL2GL2GLGNDL8G
LNG2BR8D2LGL2NG2BR4ENFGD3NR2DL2G
LBR5FRFR5ER2ER5FR2FR5ERE2R2FRLHL
2UNL2U4LNGR2FR2NF2L2H2U2R6FRF2BL
10U3L2NDHLHL5NGUR2BR3U2HU2HNU4HU
3NUGL2HL3BD13U3LND3U2HUH2RGFDFD
600 D(8)=15:D$(8)="BR5R5FL7ND6GD
8HNUD2LGDR7D2RU2R7UH2DNU3HU8LD5
605 D$(9)="D15
610 RETURN
615 CLS:PRINT@12,"DESIGNS":PRINT
@65,"1: VERTICAL STRIPES":PRINT@
97,"2: HORIZONTAL STRIPES":PRINT
@129,"3: CONCENTRIC SQUARES":PRI
NT@161,"4: HEART":PRINT@193,"5:
XMAS TREE"
620 PRINT@225,"6: DIAMONDS & TRI
ANGLES":PRINT@257,"7: COCO CAT":
PRINT@289,"8: BELL":PRINT@321,"9
: VERTICAL BAR
625 POKE&H23,A1:POKE&H24,A2
630 K$=INKEY$:IFK$=""THEN630
635 IFK$<"0" OR K$>"9"THENSOUND6
0,5:RETURN
640 K=VAL(K$):F$(0)=D$(K):M(0)=D
(K):RETURN
```

35	31	475	84
95	32	540	155
160	62	585	125
230	176	630	55
290	34	665	158
385	161	END	230
430	251		

Listing 2: DESKTOPH

```
0 RGB:WIDTH40:CLS3:LOCATE14,8:AT
TR7,2:PRINT"DESKTOP ";:ATTR7,2,U
:PRINT"HIGH";:ATTR7,2:LOCATE11,1
2:PRINT"BY H. Allen Curtis":LOCA
TE13,14:PRINT"COPYRIGHT 1987":LO
CATE24,8:ATTR7,2
5 CLEAR4000:A=&H1600:A$="34761F5
2313A1E428E7072BFFFA28D188E7A7BB
FFFA28E7173BFFFA28D0A":GOSUB600:
A=A+30:A$="8E7A7BBFFFA21E4235F68
E4000CE6000A684E6C4A7C0E7808C600
026F339":GOSUB600
10 CLEAR5000:W=320:H=1
15 HCOLOR3,0:ON BRK GOTO715
20 K$=K$+"C":A1=PEEK(VARPTR(K$)+
2):A2=PEEK(VARPTR(K$)+3):IFA2<2T
HENA2=254:A1=A1-1:GOTO40ELSEA2=A
2-2:GOTO40GOTO40
25 GOSUB485:CLS:LOCATE12,8:PRINT
"FILENAME: ";:LINEINPUTF$:POKE&H
FFA2,&H70:SAVEM"OUT1",&H4000,&H5
FFF,&HAC73:POKE&HFFA2,&H71:SAVEM
"OUT2",&H4000,&H5FFF,&HAC73:POKE
&HFFA2,&H7A:RENAME"OUT1/BIN"TOF$
+"/HR1":RENAME"OUT2/BIN"TOF$+"/H
R2":RETURN
30 GOSUB485:CLS:LOCATE12,8:PRINT
"FILENAME: ";:LINEINPUTF$:RENAME
F$+"/HR1"TO"IN1/BIN":RENAMEF$+"/
HR2"TO"IN2/BIN":POKE&HFFA2,&H70:
LOADM"IN1":POKE&HFFA2,&H71:LOADM
"IN2":POKE&HFFA2,&H7A
35 RENAME"IN1/BIN"TOF$+"/HR1":RE
NAME"IN2/BIN"TOF$+"/HR2":RETURN
40 L2=1:P=176:DIMF$(84),M(84):GO
SUB630:F$(0)=D$(7):M(0)=D(7):K$=
"1":GOSUB350:POKE&HFFD9,0
45 C1=63:PALETTE0,63:PALETTE1,0:
PALETTE2,63:PALETTE3,0
50 HSCREENH:HBUFF1,99:HGET(8,152
)-(9,152+D),1
55 HBUFF4,1824:HBUFF5,3624:HGET(
16,20)-(111,95),4:HBUFF6,1520:HG
ET(16,20)-(111,170),5
60 HCLS:T=V:L=U
65 IF(Q=0 OR Z=U) AND L+4>W-1THE
NL=U:IFT<P THENT=T+D+1
70 IFQ=1 AND Z<>U AND L+4>W-1THE
NGOSUB195
75 HGET(L,T)-(L+1,T+D),1:HLINE(L
,T)-(L+1,T+D),PSET,BF
80 POKE&H23,A1:POKE&H24,A2
85 K$=INKEY$:IFK$=""THEN85
90 K=ASC(K$):IFK>64 AND K<91THEN
N=K-64:B=N:HLINE(L,T)-(L+1,T+D),
PRESET,BF:GOTO180
95 IFK>96 AND K<123THENN=K-96:B=
N+26:HLINE(L,T)-(L+1,T+D),PRESET
,BF:GOTO180
```

```
100 IFK>47 AND K<58THENN=K-47:B=
N+52:HLINE(L,T)-(L+1,T+D),PRESET
,BF:GOTO180
105 IFK>32 AND K<48THENN=K-32:B=
N+62:HLINE(L,T)-(L+1,T+D),PRESET
,BF:GOTO180
110 IFK>57 AND K<65THENN=K-57:B=
N+77:HLINE(L,T)-(L+1,T+D),PRESET
,BF:GOTO180
115 IFK=32THENZ=L+S:IFL+8<W THEN
HLINE(L,T)-(L+7,T+D),PRESET,BF:L
=L+S:GOTO65ELSEHLINE(L,T)-(L+1,T
+D),PRESET,BF:L=U:T=T+1+D:GOTO65
120 IFK=13THENHPUT(L,T)-(L+1,T+D
),1:L=U
125 IFK=13 AND T<P THENT=T+1+D:G
OTO65
130 IFK=8 AND L>1THENL=2*INT(.5*
L):HLINE(L,T)-(L+1,T+D),PRESET,B
F:L=L-2:GOTO65
135 IFK=93THENB=0:HLINE(L,T)-(L+
1,T+D),PRESET,BF:GOTO180
140 IFK=94THENHPUT(L,T)-(L+1,T+D
),1:L=U:IFT>D THENT=T-1-D:GOTO65
145 IFK=91THENZ=U:HPUT(L,T)-(L+1
,T+D),1:HDRAW"BM"+STR$(L)+","+ST
R$(T+1+INT(.75*D))+"R3":L=L+4:IF
L>W-5THENL=L-4
150 IFK=9 AND L+4<W THENHPUT(L,T
)-(L+1,T+D),1:L=L+4:GOTO65
155 IFK=92THEN60
160 IFK=4THENHPUT(L,T)-(L+1,T+D)
,1:GOTO230
165 IFK=10THENHPUT(L,T)-(L+1,T+D
),1:IFT3=0THENT3=1:L=T1 ELSEIFT3
=1THENT3=0:L=T2
170 IFK=21THENHPUT(U,T)-(W-1,T+D
),4:L=U:GOTO65
175 GOTO65
180 IFL+M(B)<W THENGOSUB225:L=L+
2*INT(.5+M(B)*.5)+2:IFL>W-1THENL
2=L-W+1:L=W-1:GOTO65ELSE65
185 IFQ=0 OR Z=U THENL=U:IFT<P T
HENT=T+D+1:GOTO90ELSE90
190 GOSUB195:GOTO90
195 IFH=3THENZ1=8*INT(.125*Z)
200 IFH=1THENZ1=4*INT(.25*Z)
205 Z=Z1
210 HGET(Z,T)-(L,T+D),6:HPUT(Z,T
)-(L,T+D),4:L1=L-Z:L=U:Z=U:IFT<P
 THENT=T+D+1
215 IFL+L1<0THENL1=L1+2:GOTO215
220 HPUT(L,T)-(L+L1,T+D),6:L=L+L
1+L2:L=2*INT(.5*L+.5):L2=0:RETUR
N
225 HDRAW"BM"+STR$(L)+","+STR$(T
```

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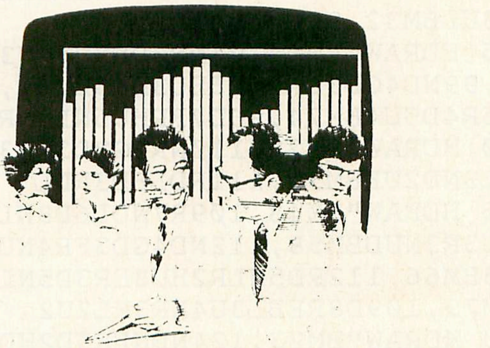

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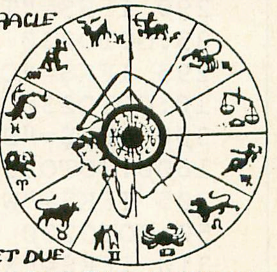

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```
)+F$(B):RETURN
230 HSCREEN0:CLS:ATTR0,4:LOCATE1
0,5:PRINT"B: BACK TO SCREEN":LOC
ATE10,6:PRINT"C: COLOR SWAP":LOC
ATE10,7:PRINT"D: DESIGN SELECT
235 LOCATE10,8:PRINT"F: FONT SEL
ECT":LOCATE10,9:PRINT"I: INPUT":
LOCATE10,10:PRINT"K: KEYS LISTED
":LOCATE10,11:PRINT"M: MARGIN SE
T":LOCATE10,12:PRINT"O: OUTPUT":
LOCATE10,13:PRINT"R: RESOLUTION
CHANGE
240 LOCATE10,14:PRINT"S: SCREEN
SWITCH":LOCATE10,15:PRINT"T: TAB
 SET":LOCATE10,16:PRINT"W: WORDW
RAP SET":LOCATE10,17:PRINT"X: EX
IT DESKTOP":LOCATE14,17:POKE&H23
,A1:POKE&24,A2:POKE&HFFD8,0
245 K$=INKEY$:IFK$=""THEN245
250 IFK$="D" OR K$="d"THENGOSUB6
80:GOTO230
255 IFK$="F" OR K$="f"THENGOSUB3
25:GOTO380
260 IFK$="B" OR K$="b"THEN320
265 IFK$="I" OR K$="i"THENGOSUB3
0:GOTO230
270 IFK$="K" OR K$="k"THENGOSUB6
05:GOTO230
275 IFK$="O" OR K$="o"THENGOSUB2
5:GOTO230
280 IFK$="M" OR K$="m"THENGOSUB5
00:GOTO230
285 IFK$="R" OR K$="r"THENIFH=1T
HENH=3:U=2*U:W=2*W:T1=2*T1:T2=2*
T2:GOTO230ELSEH=1:U=.5*U:W=.5*W:
T1=.5*T1:T2=.5*T2:GOTO230
290 IFK$="T" OR K$="t"THENGOSUB5
85:GOTO230
295 IFK$="C" OR K$="c"THENGOSUB7
10:GOTO230
300 IFK$="S" OR K$="s"THENEXEC&H
1600:GOTO230
305 IFK$="W" OR K$="w"THENGOSUB5
50:GOTO230
310 IFK$="X" OR K$="x"THEN715
315 SOUND60,5:SOUND60,5:GOTO230
320 POKE&HE6E4,&HE6:HSCREENH:POK
E&HE6E4,&HE7:POKE&HFFD9,0:GOTO38
5
325 GOSUB390
330 POKE&H23,A1:POKE&H24,A2
335 K$=INKEY$:IFK$="" THEN335
340 IFK$<"1" OR K$>"2" THENSOUND
60,10:RETURN
345 GOSUB485
350 GOSUB495
355 OPEN"I",#1,"FONT"+K$
360 FORI=1TO84:LINEINPUT#1,F$(I)
:NEXT
365 FORI=1TO84:INPUT#1,M(I):NEXT
370 INPUT#1,D,S:CLOSE#1
375 RETURN
380 HPUT(16,20)-(111,170),5
385 GOSUB545:HGET(L,T)-(L+1,T+D)
,1:GOTO65
390 POKE&HE6E4,&HE6:HSCREENH:POK
E&HE6E4,&HE7:HGET(16,20)-(111,17
0),5:HPUT(16,20)-(111,95),4:HPUT
(16,96)-(111,170),4:HDRAW"BM25,2
8NGD6NL2RNR2U6BM32,29RDLBD3RDL
395 HDRAW"BM50,24G3ERE2R4GNL3G4D
5EU4BR2D5G4UH2LG2ER3FERE2URUE2NF
G2U4E4F2DH2DFBM64,29G2ND4LD4NHFR
E2NU5RU4FBM72,29G2RD4NHFNEU4NU2E
3ND6FNFD6E2BM83,25G3LR3NR2NUD8NE
2H2RU5
400 HDRAW"BM24,43NGNDR3ND2FDGL2N
G2DG2R5ULBM32,44RDLBD3RDL
405 HDRAW"BM49,43R6NDNGL5D3NR3D3
NLR2HU4BM59,45ND3GD2FR3NU3EU2HL2
BM66,45D4RU4R3D4RU3BM76,43ND5G2N
R4FD2FRE
410 HDRAW"BM24,62NGNDR3ND5FDGNL2
FDGL3ULBM32,63RDLBD3RDL
415 HDRAW"BM50,56R5BR2DNLNRDRNRD
RE2BL7L5DLNGBR5G2ND8GD8BDBL2L2DR
2DFNDRURE2U9NE3RD3ND4REFBM64,61G
2ND6LD5LF2RE2NU7RU6FBM72,61NG2D3
E3DRFLD7NE2HNU6BL2GNU5LNHU7BM83,
57G2RD11NE2H2RU8L2R5
420 HDRAW"BM26,81G3DE4D6NLRNRU2N
RNL4U4BM32,82RDLBD3RDL
425 HDRAW"BM46,78R11D2RHL2BL6D6R
3D2ENRHL3D6GU13LBM62,82G3D2F3R5E
3U2H3L4G3D2F3R3E3U2H2BM72,82R3GN
LD7RU5NU2E3R2DRD7LNUE2U4BM88,80D
LGR7NR5G5UNE2FDRDRDR4E2
430 HDRAW"BM23,98NR5D2EDR3ND3FD2
GL3ULBM32,99RDLBD3RDL
435 HDRAW"BM48,96NR6D8RU4NU3R3BM
56,99ND4GD3FR4NU5EU3HL3BM64,99D5
RU5R4D5U4BM74,96D7FRHU5NL3NR2U2
440 HDRAW"BM25,110NR2G2D3FR3NU2E
UHL3ND2UEBM32,111RDLBD3RDL
445 HDRAW"BM48,109R7NDL6D8NLR2HU
3NU3R3NUDBM58,112ND4GD3FR4NU4EU3
HL3BM66,112RD5NLR2HU3ER3D5NLR2HU
3BM79,109D8REBL3U4NR3NL2U2
450 HDRAW"BM23,124NDNFR5D2HDG2D2
RU2EBM32,125RDLBD3RDL
455 HDRAW"BM52,123R4NFL4G2D2NR3D
4BM60,125G2D2F2R2E2U2H2LBM68,125
ND6FER2F2D4BM78,123DND7GR4
460 HDRAW"BM24,136ND5GDFGDFR3NU5
EUHNL2EUHL2BM32,137RDLBD3RDL
465 HDRAW"BM50,136NGR3NR4D4L2NGR
```

```
3NU3NR2D2HD2GL3BM62,138G2DED2R3E
2UGU2L2BM70,138NGD4RUNU3E3RD4RNE
U3BM81,136D6R2NEL2HU4GR4
470 HDRAW"BM24,149ND2GDFR3DG2NLR
E2U3HND2L2BM32,150RDLBD3RDLBM50,
148NG3NR7ND3FD3NR4L3NGR3ND7LD8GL
3BM60,148G3NRF2NU3R3E2NU2LU3L2BM
68,148G2RD3RU2NU2E3RD5RNE2U4BM79
,147NG2D2NR2ND3LD3FR2E2
475 HDRAW"BM24,163ND5GD4FR3U5G2D
E3ND4HL2BM32,164RDLBD3RDLBM50,16
4NR3D2NR2D3BM56,166GDFREUHBM61,1
66D2NDE2FD2BM68,164D2NLNRD2FE
480 RETURN
485 POKE&H23,A1-1:POKE&H24,A2:RE
TURN
490 POKE&H23,A1-2:POKE&H24,A2:RE
TURN
495 POKE&H23,A1-3:POKE&H24,A2:RE
TURN
500 GOSUB485:CLS:LOCATE6,8:PRINT
"ENTER TOP MARGIN (0 - 10): ";:L
INEINPUTV$:LOCATE6,12:PRINT"ENTE
R LEFT MARGIN ";
505 LOCATE24,12:IFH=1THENPRINT"(
0 - 200):        ":LOCATE35,12ELSEP
RINT"(0 - 400):        ":LOCATE35,1
2
510 GOSUB490:LINEINPUTU$:V=VAL(V
$):U=VAL(U$):IFH=1THENU=4*INT(.2
5*U):Z=U ELSEU=8*INT(.125*U):Z=U
515 IFV<0THENV=0
520 IFV>10THENV=10
525 IF U>W-50THENSOUND60,5:LOCAT
E10,15:PRINT"LEFT MARGIN TOO BIG
":LOCATE8,16:PRINT"RELATIVE TO R
IGHT MARGIN!":LOCATE14,20:PRINT"
TRY AGAIN.":GOTO505
530 IFU<0THENU=0
535 IFH=1 AND U>200THENU=200
540 IFH=3 AND U>400THENU=400
545 P=V+(D+1)*(-1+INT((192-V)/(D
+1))):L=U:T=V:RETURN
550 CLS:LOCATE6,6:PRINT"VALUE 0
MEANS NO WRAP-AROUND.":LOCATE6,8
:PRINT"ANY OTHER VALUE SPECIFIES
":LOCATE9,9:PRINT"THE RIGHT MARG
IN."
555 GOSUB485:LOCATE6,12:PRINT"EN
TER VALUE ( 0 -";320+(H-1)*160;"
):        ":LOCATE31,12:LINEINPUTW$
:IFVAL(W$)=0THENQ=0:RETURN
560 Q=1:W=VAL(W$):IFW<U+50THENSO
UND60,5:LOCATE8,16:PRINT"RIGHT M
ARGIN TOO SMALL":LOCATE8,17:PRIN
T"RELATIVE TO LEFT MARGIN.":LOCA
TE15,19:PRINT"TRY AGAIN.":GOTO55
5
565 IFH=1 AND W>320THENW=320
570 IFW>640THENW=640
575 IFH=1THENW=4*INT(.25*W)ELSEW
=8*INT(.125*W)
580 RETURN
585 GOSUB485:CLS:LOCATE6,8:PRINT
"ENTER 1ST TAB VALUE: ";:LINEINP
UTT$:T1=2*INT(VAL(T$)*.5):IFH=1
AND T1>320THENT1=320ELSEIFT1>640
THENT1=640
590 GOSUB485:LOCATE6,12:PRINT"EN
TER 2ND TAB VALUE: ";:LINEINPUTT
$:T2=2*INT(VAL(T$)*.5):IFH1 AND
T2>320THENT2=320ELSEIFT2>640THEN
T2=640
595 RETURN
600 FORI=0TO29:B$=LEFT$(A$,2):PO
KEA+I,VAL("&H"+B$):A$=RIGHT$(A$,
LEN(A$)-2):NEXT:RETURN
605 CLS:LOCATE5,3:PRINT"RIGHT AR
ROW: MOVE CURSOR RIGHT":PRINT"
   LEFT ARROW: BACKSPACE":PRINT"
    UP ARROW: CARRIAGE RETURN &
":PRINT"          MOVE UP 1 LIN
E":PRINT"     DOWN ARROW: TAB"
610 PRINT"    SHIFT RIGHT ARROW
```

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```
: DRAW DESIGN":PRINT"      SHIFT
LEFT ARROW: CLEAR LINE":PRINT"
  SHIFT DOWN ARROW: UNDERLINE":
PRINT"     SHIFT CLEAR: CLEAR SC
REEN
615 PRINT"      ENTER: CARRIAGE R
ETURN &":PRINT"          MOVE D
OWN 1 LINE":PRINT"     SHIFT 0:
UPPER/LOWER CASE
620 LOCATE5,22:PRINT"PRESS ";:AT
TR0,4,U:PRINT"SPACE";:ATTR0,4:PR
INT" TO RETURN TO MENU";:LOCATE1
2,22
625 K$=INKEY$:IFK$=""THEN625ELSE
RETURN
630 D(1)=14:D$(1)="D15BR5U15BR5D
15BR5U15
635 D(2)=14:D$(2)="R15BD5L15BD5R
15BD5L15
640 D(3)=14:D$(3)="R15D15L15U14B
R2BDR11D11L11U10BR2BDR7D7L7U6BR2
BDR3D3L3U2
645 D(4)=14:D$(4)="BR3G2NUDLD5NF
7EDF6NE6RE6NHU5LU2LNL3HL2G2NRNH2
DH3DL
650 D(5)=14:D$(5)="BR7BDG3RNE2DG
3RNE3DG3RNE3R6ND2R7H3LNF2ENH3RH3
UNHRH2
655 D(6)=14:D$(6)="R5G5NU4BD2E7F
7G7H7BD2D5R5NH4BR4R5U5NG4BU4U5L5
NF4BL2BD3G4F4E4H4BD3GFE
660 D(7)=62:D$(7)="BR31BD4L3GL3N
U2D2GNU4GD2GD3R5NFUL2GL2GLGNDL8G
LNG2BR8D2LGL2NG2BR4ENFGD3NR2DL2G
LBR5FRFR5ER2ER5FR2FR5ERE2R2FRLHL
2UNL2U4LNGR2FR2NF2L2H2U2R6FRF2BL
10U3L2NDHLHL5NGUR2BR3U2HU2HNU4HU
3NUGL2HL3BD13U3LND3U2HUH2RGFDFD
665 D(8)=15:D$(8)="BR5R5FL7ND6GD
8HNUD2LGDR7D2RU2R7UH2DNU3HU8LD5
670 D$(9)="D15
675 RETURN
680 CLS:LOCATE15,6:ATTR0,4,U:PRI
NT"DESIGNS";:ATTR0,4:LOCATE9,9:P
RINT"1: VERTICAL STRIPES":LOCATE
9,10:PRINT"2: HORIZONTAL STRIPES
":LOCATE9,11:PRINT"3: CONCENTRIC
 SQUARES":LOCATE9,12:PRINT"4: HE
ART":LOCATE9,13:PRINT"5: XMAS TR
EE"
685 LOCATE9,14:PRINT"6: DIAMONDS
 & TRIANGLES":LOCATE9,15:PRINT"7
: COCO CAT":LOCATE9,16:PRINT"8:
BELL":LOCATE9,17:PRINT"9: VERTIC
AL BAR":LOCATE15,6
690 POKE&H23,A1:POKE&H24,A2
695 K$=INKEY$:IFK$=""THEN695
700 IFK$<"0" OR K$>"9"THENSOUND6
0,5:RETURN
705 K=VAL(K$):F$(0)=D$(K):M(0)=D
(K):RETURN
710 C3=C1:C1=C2:C2=C3:PALETTE0,C
1:PALETTE1,C2:PALETTE2,C1:PALETT
E3,C2:RETURN
715 RGB:CLS3:POKE&HFFD8,0
```

28	110	122	78
44	206	148	198
66	96	END	99
94	155		

Listing 3: GENFONT1

```
0 CLS:PRINT@199,"GENERATE FONT1"
:PRINT@261,"BY H. ALLEN CURTIS":
PRINT@295,"COPYRIGHT 1987
8 DIMF$(84),M(84)
9 D=15:S=8
10 M(1)=12:F$(1)="BR4BDG3D2NFUE4
NR3DR6UD11EL2NHU9G4U2LNGBD3GNR5G
2NG2R3GR3GL"'A
12 M(2)=12:F$(2)="BR3BDNG3R5GL4N
GR4G4NUFDLDBU8BR8ND2FDG5U3NE3LD4
GL3NG2R2DRNR2DR4E3UGUH"'B
14 M(3)=12:F$(3)="BR4BDG4D3RNU3N
RDNR2FNRF2R5NE3UL5U7NGEND5E2D2ED
2R2NE2UL"'C
16 M(4)=12:F$(4)="BR3BDG2NGRE2NR
7GR8ND7DL2FD6G2L2NL2UL3EL3NG2E2N
U2LU2E3"'D
18 M(5)=15:F$(5)="BR3BDG3ERE2R4G
NL3G4ND2RNDBR2NRE5D2EDNRD2NE3G2N
R3L4D2NEDR3D2R2ENEL6HL2G2"'E
20 M(6)=16:F$(6)="BR6BDG3ERE2R4G
NL3G4D5EU4BR2D5G4UH2LG2ER3FERE2U
RUE2NFG2U4E4F2DH2DF"'F
22 M(7)=12:F$(7)="BR4BDG4ND3RD4F
3R5E3U2LND2L4NLE4NEL3NDNFLNEU2G4
RND6ED4GD2R5"'G
24 M(8)=13:F$(8)="BR3BDG3ERE2NR4
DR3G4NRNFD2BD2LNG2R3GR3FL3U2EU3N
E5RD2E5FND6LD8GDF"'H
26 M(9)=11:F$(9)="BR3BDG3ERE2NR4
DR3G3LGLNGR3DL2FBD2LNG2R2DFU2RU4
RND2UE4"'I
28 M(10)=14:F$(10)="BR6BDG3ERE2N
R4DR3G5LNGR3NUDNL2D2HD2BD2DLH2LG
2ER3FDE5NU4LU4E5"'J
30 M(11)=15:F$(11)="BR3BDG3ERE2N
R4DR3G4NRNFD2BD2LNG2R3GNR3FR3LH2
ENU3EU3E4D2EDR2NEL2BD2L3NGR3DLG2
```

```
FRD3E2HD"'K
32 M(12)=15:F$(12)="BR3BDG3ERE2N
R4GR3G4NRNFD2BD2NG2R6F2E2GLGLUL3
U5END3E4D2ED2RNUE2"'L
34 M(13)=15:F$(13)="BR3BDG3ERE2R
GR3G4RD2HD3LNG2R3GFNR3UR4NENU9HU
3NLUNR2NU5E5D11NHE2LU8"'M
36 M(14)=16:F$(14)="BR2BDG2ER3NH
GD7LNG2R2GR3GNLBR4HUH2UHUH2RF2DF
DF2DFU11NRGR3GR3NEGL"'N
38 M(15)=13:F$(15)="BR4BDG4ND3RD
4ED2ED2FNU7NR5ER5E3NU3LU4GU2GU2N
GNL3HL2G3NGRD4"'O
40 M(16)=12:F$(16)="BR5BDG2R2NUD
9F2RNELH3D2NGU5R2NUR2GNRFRE3NU5L
U6LG4L4NGFRDGLG2F"'P
42 M(17)=14:F$(17)="BR4BDG4ND3RD
4NER2D2NHNR7FR5E2H2LNGRF3REG2BU3
NU5EU3L2U2GU2GUNL2UL2G2NG2D5GNDU
4"'Q
44 M(18)=13:F$(18)="BR3BDG3ERE2N
R4DR3G4D2EUBD4L2NG2R3GNR3FR3BR3N
U3E2NLH2LHE3NU2LU3G5D3E2LU"'R
46 M(19)=13:F$(19)="BR5BDG3RDR2B
U2URDR5NE2GL3BD2NL2RGR3GR2G3LEL3
ELNL3HL2G2DF2RE"'S
48 M(20)=14:F$(20)="BR3BDG3ERE2N
R5DR6DR3NEGL2HLG3RND3ED3G2UH3NRN
E3D2RDRDF2NU2R5NE3UL4"'T
50 M(21)=12:F$(21)="BR4BDG2R2NUN
D5G2LNGF2NU2D3LNGR3GR2NRGR3E2ND2
NFNR2UNU8RU7L2G"'U
52 M(22)=10:F$(22)="BR4BDG2R2NUN
D5G2LNGF2NU2D3LNGR3GR2GRE4NU6LU7
G2"'V
54 M(23)=14:F$(23)="BR4BDG2R2NUN
D5GD2L2NGF2NUD2LNGR3GRDE3NDU8NG2
FD9FNU3E3NU7EU6HG2"'W
56 M(24)=13:F$(24)="BR2BDNG2ND2F
2LDR2D2NL3HR2DG4NG2R3GR3GNLBR5E2
H4NR3LF4LH4R2E3NEL3EL3ER"'X
58 M(25)=12:F$(25)="BR4BDG2RED6H
NU3HLNGF2D2LNGR3GR2NRGR5FDGL5EL3
NGR3BR6UHNU10HU10G2"'Y
60 M(26)=14:F$(26)="BR3BDNG2R3GR
3DNL2R4UGLG3NL3NR3G3NR5LNG3DNGR7
GNLNR3FR2E2"'Z
62 M(27)=7:F$(27)="BRBD5GF2GND3L
D2R3EF2NEH3R2NDU3NEHL2F2NUD"'a
64 M(28)=6:F$(28)="BR3BDG2NHD8NH
FNU9E2R2NU4HU4G2"'b
66 M(29)=5:F$(29)="BR2BD5G2RD4NH
FNE2U6EDR2G"'c
68 M(30)=8:F$(30)="BDF4LND6GD5NH
FE2R2U4NEH5LF5ND3L"'d
70 M(31)=6:F$(31)="BR2BD5G2RD4NH
```

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```
FE2HE2RGU2L2UGD5"'e
72 M(32)=7:F$(32)="BR4BDRFNELHG3
NLRD7NHFNE2U9FR"'f
74 M(33)=9:F$(33)="BR3BD5ND6G2RD
4NHFG2NGRNR4FR3E2ULU4NG3NE2U2LND
5UG2"'g
76 M(34)=6:F$(34)="BR3BDG2NHD8NH
FNEU4NU5E3ND7FD4GDF"'h
78 M(35)=3:F$(35)="BR2BDGBD4NGD5
NHFNEU7F"'i
80 M(36)=5:F$(36)="BR4BDGBD4NENR
2NGD5RNU4DRDG2LNH2UR"'j
82 M(37)=8:F$(37)="BR3BDG2NHD8NH
FUNRU3NU5E3ND2FDG2NLFRGRDE2"'k
84 M(38)=3:F$(38)="BR3BDG2NHD8NH
FNEU9"'l
86 M(39)=12:F$(39)="BR2BD5G2RD4N
HFNEU6FE2D6FNEU6FE2D6FNE2U6E"'m
88 M(40)=8:F$(40)="BR2BD5G2RD4NH
FNEU4NU2E3ND6FNFD6E2"'n
90 M(41)=7:F$(41)="BR4BD5G2ND4LD
4NHFRE2NU5RU4F"'o
92 M(42)=8:F$(42)="BR3BD5G2RD3NG
2D4NGENFU5NU2E3ND5FD4NFG2H"'p
94 M(43)=7:F$(43)="BR2BD5G2RNE2N
D3RD5NH2RE2D4NGENFU6NEHNLD3"'q
96 M(44)=7:F$(44)="BR2BD5ND6G2RD
4NHFNE2U4E3DRFG"'r
98 M(45)=8:F$(45)="BRBD5GNDRD2R3
G3NGR3GR3NE2UE2LH2NDNE2UL2EL2"'s
100 M(46)=5:F$(46)="BR4BDG3LR3NR
2NUD8NE2H2RU5"'t
102 M(47)=7:F$(47)="BR2BD5ND6G2R
D4NHFE2F2NEU7G2RD3"'u
104 M(48)=7:F$(48)="BR2BD2G2DED7
NEFNU6E3NU3DEU4NFUG2"'v
106 M(49)=11:F$(49)="BR2BD3G2DED
FND4LD4HDERE2ND3U3F2LD3RE2U3F2LD
3NRHD2"'w
108 M(50)=10:F$(50)="BR2BD5NG2D2
ENFD3G2NGEND2E2R2E3G2NU2G2F3NE2U
2LU"'x
110 M(51)=7:F$(51)="BR2BD5ND6G2R
D4NHFE3U3NGENFD5LDRDRDG2NL2UL4G"
'y
112 M(52)=10:F$(52)="BR2BD5NG2NR
3DRBD2R3E2NENL2G2NR3G3LNGR2FR3HR
2E"'z
114 M(53)=8:F$(53)="BR3BD2G3D4NF
3NERNF3RF3E3U4GU2GU2GU2LD"'0
116 M(54)=4:F$(54)="BR3BD2NG3D10
NEHNHU7"'1
118 M(55)=8:F$(55)="BR3BD2G2DE3N
DF3NLDGUNG2LG5DE2DRFR2NUE2"'2
120 M(56)=7:F$(56)="BR3BD2NG3RNG
2NDF3NDLDGNL2F2UGDG2LH3FRFR"'3
122 M(57)=8:F$(57)="BR6BD2ND8G6R
7NFG2DNR2NFHEU5"'4
124 M(58)=7:F$(58)="BRBD2R5GL4D4
RE2R2ND4FD3G3LH2NHRFR"'5
126 M(59)=7:F$(59)="BR4BD2F2NEL2
ULG3ND3RD2E2R2F2NDLD2G2LH2RFR"'6
128 M(60)=8:F$(60)="BRBD2NR7GR7D
G3ND4GD4"'7
130 M(61)=5:F$(61)="BR2BD2G2DF2G
2DED2FRE2ULULUNH2E2UGU2H"'8
132 M(62)=7:F$(62)="BR3BD2G3DFUF
2E2RND2UH2NLUF3D3G4U2L2NGF"'9
134 M(63)=1:F$(63)="BDFND3LD5BD3
DRD"'!
136 M(64)=4:F$(64)="BDDRD2BR3U2L
U"'"
138 M(65)=9:F$(65)="BR3BD3G2LR2D
4NL2D2EU6FRE2D2NR2D4NR2NL3DGU6"'
#
140 M(66)=8:F$(66)="BR4BDND11G3D
RDR2UE2NEL3D4R2DRDG2L2UL2NEG"'$
142 M(67)=9:F$(67)="BRBD2GFEBR5N
UG6DE7BD5GFE"'%
144 M(68)=9:F$(68)="BR2BDG2DF2G2
DFNU2FRE3D3FNE2U3ENRGH2LNFHNH2E2
UHND2H"'&
146 M(69)=1:F$(69)="BDDRDG"''
148 M(70)=5:F$(70)="BR3BDNR2G3D5
F3R2LH3U5"'(
150 M(71)=5:F$(71)="BDRF3D6G2NL2
E3U5H3"')
152 M(72)=9:F$(72)="BRBD4F3NL4E3
RNFG3NR4NF3G3LNHE2"'*
154 M(73)=9:F$(73)="BR5BD4D5GU3N
U2NL4NR5"'+
156 M(74)=1:F$(74)="BD10DRDG"',
158 M(75)=9:F$(75)="BD7R9"'-
160 M(76)=2:F$(76)="BD10DR2D"'.
162 M(77)=10:F$(77)="BR10G10DE10
"'/
164 M(78)=2:F$(78)="BRBD4GR2GBD3
GR2G"':
166 M(79)=1:F$(79)="BD4DRDBD4HDF
G"';
168 M(80)=4:F$(80)="BR4BD3G4F4UH
3E3"'<
170 M(81)=9:F$(81)="BD6R9BD3L9"'
=
172 M(82)=4:F$(82)="BD3F4G4UE3H3
"'>
174 M(83)=6:F$(83)="BR2BDNG2R2DR
DNG3RG4BD3DRD"'?
176 M(84)=13:F$(84)="BR5BDR5F3ND
2UHD4G3U4LD2ND2G3NU3HU2E2NRBL5E3
NRG3ND5GD4F2UF2R5ERE"'@
1000 OPEN"O",#1,"FONT1"
1010 FORI=1TO84:PRINT#1,F$(I):NE
XT
1020 FORI=1TO84:PRINT#1,M(I):NEX
T
1030 PRINT#1,D:PRINT#1,S:CLOSE#1
```

26	143	126	245
45	244	149	35
67	131	173	216
86	176	END	221
109	15		

Listing 4: GENFONT2

```
0 CLS:PRINT@199,"GENERATE FONT2"
:PRINT@261,"BY H. ALLEN CURTIS":
PRINT@295,"COPYRIGHT 1987
8 DIMF$(84),M(84),X(84),Y(84)
9 P=184:D=7:S=6
10 M(1)=7:F$(1)="BR3RFL3D3GDLUEN
R5UER3DRD3RU
11 DATA 7,3,0
12 M(2)=6:F$(2)="R5ND6FDGNL4FDGL
5EU4RD4
13 DATA 6,0,0
14 M(3)=6:F$(3)="BR2R3NDNFL3G2D2
F2R3NUNEL2H2U2E
15 DATA 6,2,0
16 M(4)=6:F$(4)="R4NDF2ND2LD3LDL
4EU4RD4
17 DATA 6,0,0
18 M(5)=6:F$(5)="R6NDNGL5D3NR3D3
NLRNU5R4UL
19 DATA 6,0,0
20 M(6)=6:F$(6)="R6NDNGL5D3NR3D3
NLR2HU4
21 DATA 6,0,0
22 M(7)=6:F$(7)="BR2R3NDNFL3DLND
4GD2F2NUR3U3NLRD3
23 DATA 6,2,0
24 M(8)=5:F$(8)="D6RU3NU3R4U3LD6
RU2
25 DATA 5,0,0
26 M(9)=5:F$(9)="R3NR2D6NR2LNL2U
5
27 DATA 5,0,0
28 M(10)=5:F$(10)="BR3R2ND5GD5L3
U2LD
29 DATA 5,3,0
30 M(11)=6:F$(11)="RD6NLRU3NU3R2
F2DLUH2E3NLDG
31 DATA 6,0,0
32 M(12)=6:F$(12)="RD6NLR5U2G2L2
U6R
33 DATA 6,0,0
34 M(13)=6:F$(13)="D6RU5F2NLNDNR
E3D6LU4
35 DATA 6,0,0
36 M(14)=6:F$(14)="D6RU6F2NLDNFR
3U3LD6RU2
37 DATA 6,0,0
38 M(15)=6:F$(15)="BR2NDG2ND2RD3
RDR2URNU3EU2H2LF
39 DATA 6,2,0
40 M(16)=6:F$(16)="R5ND2FDGL3D3N
RL2EU4RD
41 DATA 6,0,0
42 M(17)=6:F$(17)="BR2DLND3GD2F2
NUR3DNRU2NLNU3EU2H2NDL
43 DATA 6,2,0
44 M(18)=7:F$(18)="RD6NLRU6R3ND2
FDGNL2NGD2FRH
45 DATA 7,0,0
46 M(19)=5:F$(19)="BRR3NDNFL3ND2
GDFNER2DR2DNLGL3UL
47 DATA 5,1,0
48 M(20)=5:F$(20)="NDR5NDL2D6NRL
2EU4
49 DATA 5,0,0
50 M(21)=5:F$(21)="ND5RD6R3U6RD6
51 DATA 5,0,0
52 M(22)=7:F$(22)="NDRD3ED3ED2RN
U2EU3FU3RD
53 DATA 7,0,0
54 M(23)=6:F$(23)="ND6RD6E2NLNUN
RF2U6RD6
55 DATA 6,0,0
56 M(24)=7:F$(24)="F6RH3NH3E3LG6
RE2
57 DATA 7,0,0
58 M(25)=7:F$(25)="NDRD2RDRD3NLR
```

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```
2HU2E3LFG2
59 DATA 7,0,0
60 M(26)=6:F$(26)="D2E2NLR4NG6DG
5R5U2G
61 DATA 6,0,0
62 M(27)=6:F$(27)="BRBD2R3ND3FDL
3GLFR2ERDR
63 DATA 6,1,2
64 M(28)=6:F$(28)="RND5RD6R3NU3E
U2HLG
65 DATA 6,0,0
66 M(29)=5:F$(29)="BRBD2R3NDNFL3
ND3GD2FR3UR
67 DATA 5,1,2
68 M(30)=6:F$(30)="BR3R2D6NRHGL2
NU3HU2ERF2U3
69 DATA 6,3,0
70 M(31)=5:F$(31)="BRBD2ND3R3NDF
DL5NUDFR3
71 DATA 5,1,2
72 M(32)=6:F$(32)="BR2R2NDNFL2D3
NRD3NRL2EU2NLU2
73 DATA 6,2,0
74 M(33)=7:F$(33)="BR2BD2ND2GDFN
R2GNLDR4NEU4FU2NRGHL
75 DATA 7,2,2
76 M(34)=6:F$(34)="RD6NLRU2NU4E2
RD4RU3
77 DATA 6,0,0
78 M(35)=3:F$(35)="BRRBD2D4NRL2E
U3L
79 DATA 3,1,0
80 M(36)=5:F$(36)="BR4RBD2ND4LD5
L3UL
81 DATA 5,4,0
82 M(37)=6:F$(37)="RD6NLRUNU5E3R
G2DRDR
83 DATA 6,0,0
84 M(38)=3:F$(38)="RD6NLR2HU5
85 DATA 3,0,0
86 M(39)=6:F$(39)="BD2D4RU4F2E2N
LD4RU3
87 DATA 6,0,2
88 M(40)=5:F$(40)="BD2D4RU4R3D4R
U3
89 DATA 5,0,2
90 M(41)=5:F$(41)="BRBD2ND3GD2FR
3NU3EU2HL2
91 DATA 5,1,2
92 M(42)=6:F$(42)="BD2RD5NLR2HU3
ER2ND2FDGL2
93 DATA 6,0,2
94 M(43)=6:F$(43)="BRBD2ND2GDFR3
D2R2HU3NEGU2L2
95 DATA 6,1,2
96 M(44)=6:F$(44)="BD2RD4NLR2HU3
FERD2RU
97 DATA 6,0,2
98 M(45)=5:F$(45)="BRBD2NR4NDGFR
3NDFGL4
99 DATA 5,1,2
100 M(46)=4:F$(46)="BR2ND5G2NR4F
D2FRE
101 DATA 4,2,0
102 M(47)=6:F$(47)="BD2ND3RD4R2E
U3RD4R
103 DATA 6,0,2
104 M(48)=5:F$(48)="BD2ND2RD3NR2
FRE2U2LD2
105 DATA 5,0,2
106 M(49)=6:F$(49)="BD2ND2RD4RUE
NUFDRU4RD2
107 DATA 6,0,2
108 M(50)=6:F$(50)="BD2F2G2RE4RG
2F2LH4
109 DATA 6,0,2
110 M(51)=5:F$(51)="BD2ND2RD3FDN
L2E2NL2U3RD2
111 DATA 5,0,2
112 M(52)=5:F$(52)="BD2NDR5G4LNE
3R5U
113 DATA 5,0,2
114 M(53)=5:F$(53)="BRND5GD4FR3U
5G2DE3ND4HL2
115 DATA 5,1,0
116 M(54)=5:F$(54)="BR2NGD6NL2RN
R2U6
117 DATA 5,2,0
118 M(55)=5:F$(55)="BRNGNDR3ND2F
DGL2NG2DG2R5UL
119 DATA 5,1,0
120 M(56)=5:F$(56)="BRNGNDR3ND5F
DGNL2FDGL3UL
121 DATA 5,1,0
122 M(57)=6:F$(57)="BR3G3DE4D6NL
RNRU2NRNL4U4
123 DATA 6,3,0
124 M(58)=5:F$(58)="NR5D2EDR3ND3
FD2GL3UL
125 DATA 5,0,0
126 M(59)=5:F$(59)="BR2NR2G2D3FR
3NU2EUHL3ND2UE
127 DATA 5,2,0
128 M(60)=5:F$(60)="NDNFR5D2HDG2
D2RU2E
129 DATA 5,0,0
130 M(61)=5:F$(61)="BRND5GDFGDFR
3NU5EUHNL2EUHL2
131 DATA 5,1,0
132 M(62)=5:F$(62)="BRND2GDFR3DG
2NLRE2U3HND2L2
133 DATA 5,1,0
134 M(63)=3:F$(63)="BRD4RU4FL3DR
3GBD3L
135 DATA 3,1,0
136 M(64)=4:F$(64)="DRUBR2DRU
137 DATA 4,0,0
138 M(65)=6:F$(65)="BRD6RU4NU2NL
```

```
2R4HULD6RU2NL5RH
139 DATA 6,1,0
140 M(66)=5:F$(66)="BR2RFRL4GRDR
3DRG2LEL3
141 DATA 5,2,0
142 M(67)=6:F$(67)="BDDRUBR4NG5R
G5BR4RUL
143 DATA 6,0,1
144 M(68)=6:F$(68)="BR2ND3GD4HDF
R2EFRH3DR2ELHU2NFL
145 DATA 6,2,0
146 M(69)=2:F$(69)="BRRDLDL
147 DATA 2,1,0
148 M(70)=3:F$(70)="BR2G2D2F2RH2
U2E2
149 DATA 3,2,0
150 M(71)=3:F$(71)="F2D2G2RE2U2H
2
151 DATA 3,0,0
152 M(72)=7:F$(72)="BRBDRD4LEHNL
R5NRHELGLD2R2DR
153 DATA 7,1,1
154 M(73)=5:F$(73)="BR2BDD2NL2NR
3D2RU4
155 DATA 5,2,1
156 M(74)=2:F$(74)="BRBD5D2NLEU
157 DATA 2,1,5
158 M(75)=5:F$(75)="BD3R5
159 DATA 5,0,3
160 M(76)=1:F$(76)="BD5DRU
161 DATA 1,0,5
162 M(77)=7:F$(77)="BR6G6RE6
163 DATA 7,6,0
164 M(78)=1:F$(78)="BDDRNUBD3DLU
165 DATA 1,0,1
166 M(79)=2:F$(79)="BRBDDRNUBD3D
GLEU
167 DATA 2,1,1
168 M(80)=4:F$(80)="BR3G3F3RH3E3
169 DATA 4,3,0
170 M(81)=5:F$(81)="BD2R5BD3L5
171 DATA 5,0,2
172 M(82)=4:F$(82)="F3G3RE3H3
173 DATA 4,0,0
174 M(83)=5:F$(83)="BRNGNDR3ND2F
DG2UGBD2R
175 DATA 5,1,0
176 M(84)=6:F$(84)="BRGD4FNR3U5E
R3FD3L3U2R2NUDL
177 DATA 6,1,0
1000 OPEN"O",#1,"FONT2"
1010 FORI=1TO84:PRINT#1,F$(I):NE
XT
1020 FORI=1TO84:PRINT#1,M(I):NEX
T
1030 PRINT#1,D:PRINT#1,S:CLOSE#1
```

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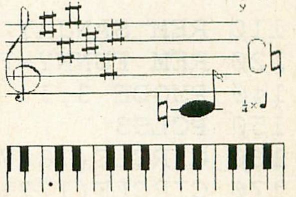


NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Fall Fun on the Run

Graphics

Freaky Face

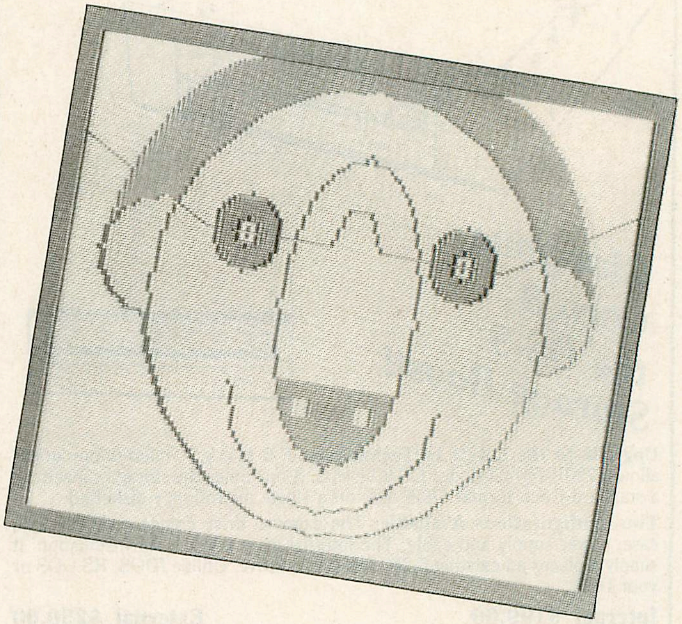
16K ECB

By Sanjay Parker

Try this program for a quick laugh. The result looks like an escapee from the CoCo Freak Show!

The listing: FUNFACE

```
110 REM SANJAY PARKER
120 REM FUNNY-FACE
140 PMODE 3,1
150 PCLS3
160 CIRCLE(78,70 ),07,4
170 CIRCLE(177,070),7,4
180 CIRCLE(78,70),17,4
190 CIRCLE(177,70),17,4
200 PAINT(177,70),2,4
210 PAINT(78,70),2,4
220 CIRCLE(177,70),2,4
230 CIRCLE(78,70),2,4
240 LINE(96 ,70)-(116,70),PSET
250 LINE(159,70)-(139,70),PSET
260 LINE(116,70)-(123,55),PSET
270 LINE(139,70)-(132,55),PSET
```



```
280 LINE(132,55)-(123,55),PSET
290 CIRCLE (114,135),7,4
300 CIRCLE(143,135),7,4
310 CIRCLE(128,96),90,4
320 CIRCLE(128,129 ) ,48,4,1,0,.
```

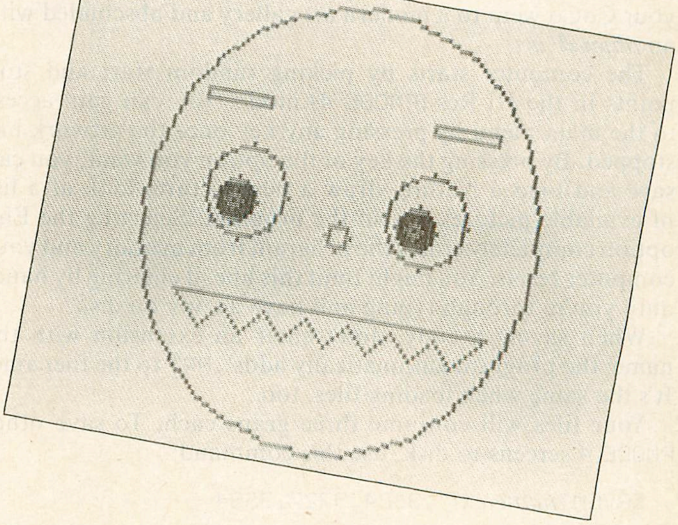
```
50
330 CIRCLE(128,96),33,4,2
340 COLOR 4,3
350 LINE(195,70)-(279,40),PSET
360 LINE(61,70)-(00,40),PSET
370 PAINT(198,109),2,4
380 PAINT(100,30),2,4
390 LINE (102,125)-(154 ,125),PS
ET
400 PAINT(115,147),4,4
410 PAINT(128,96),2,4
420 PAINT(118,48),2,4
430 PAINT(187,70),1,4
440 PAINT(87,70),1,4
450 CIRCLE(216,85),24 ,4,1,.75,.
25
460 PAINT(219,85),2,4
470 CIRCLE(38,85),24,4,1,.25,.75
480 PAINT(31,86),2,4
490 CIRCLE(128,96),114,4,1,.54,.
97
500 PAINT(60, 34),4,4
510 PAINT(22,67),4,4
520 PAINT(234,67),4,4
530 SCREEN1,0
540 FOR X=1 TO 2000:NEXT X
550 X=RND(255):SOUND X,1:GOTO550
```

16K ECB

Merry Martian

By Ed Machurek, Jr.

Who says Martians are green and mean? This little guy winks and smiles and raises his eyebrows all the while.



The listing: MARTIAN

```
0 CLS
1 PRINT:PRINTTAB(8)"MARTIAN
2 PRINT:PRINTTAB(4)"         MA
RTIAN
3 PRINT:PRINTTAB(10)"  MARTIAN
4 PRINT:PRINTTAB(14)"
      MARTIAN
5 PRINT:PRINTTAB(20)
      "MARTIAN
6 FORX=1TO3000:NEXT:CLS
7 PRINT:PRINTTAB(4)"          BY
8 PRINT:PRINTTAB(8)"    ED MACHU
REK
9 PRINT:PRINTTAB(12)"    NEW CAST
LE
10 PRINT:PRINTTAB(14)"   DELAWAR
E
110 FORX=1TO6000:NEXT:CLS
120 PMODE1,1
130 PCLS
140 SCREEN1,1
150 DRAW"BM129,130;R70;G14;H10;G
10;H10;G10;H10;G10;H10;G10;H10;G
10;H10;G10;H14;R78"
160 CIRCLE(086,086),20,3
170 CIRCLE(172,86),20,3
180 CIRCLE(126,99),07,4
190 DRAW"BM60,50;U4;R30;D4;L30"
200 DRAW"BM 168,50 ;U4;R30;D4;L3
0"
210 CIRCLE(126,96),95,3
220 CIRCLE(90,90),10,3
230 CIRCLE(176,90),10,3
240 PAINT(90,90),6,3
250 PAINT(176,90),2,3
260 CIRCLE(90,90),5,0
270 CIRCLE(176,90),5,0
280 PMODE1,3
290 PCLS
300 DRAW"BM129,130;R70;G7;H5;G5;
H5;G5;H5;G5;H5;G5;H5;G5;H5;G5;H5
;G5;H5;G5;H5;G5;H5;G5;H5;G5;H5;G
5;H7;R125"
310 CIRCLE(86,86),20,3
320 CIRCLE(172,86),30,1,.50,0
330 CIRCLE(126,99),7,4
340 DRAW"BM60,50;U8;R30;D8;L30"
350 DRAW"BM168,50;U8;R30;D8;L30"
360 CIRCLE(126,96),95,3
370 CIRCLE(90,90),10,3
380 CIRCLE(176,90),10,3
390 PAINT(90,90),6,3
400 PAINT(176,90),2,3
410 CIRCLE(90,90),5,0
```

```
420 PMODE1,1
430 SCREEN1,1
440 FORI=1TO200:NEXTI
450 PMODE1,3
460 SCREEN1,3
470 FORI=1TO200:NEXTI
480 GOTO420
```

Utilities

16K
Disk

A Demonstration in Art

By Ricky Sutphin

Looking for a way to show off your CoCo? Run this program and become the center of attention! You'll think your CoCo went to a modern art gallery and absconded with an *objet d' art*.

The computer starts by picking random start and stop points in the Hi-Res (`PMODE 4`) mode. You can gain access to the main menu by pressing any key once the artwork has stopped. By pressing the key of the option you want, you can save and load a picture, draw a new picture, look at a list of available pictures or end the program. Selecting the End option completely erases the program from memory and your computer resets. You might omit this line, if entering by hand, until you're through typing and have a copy on disk.

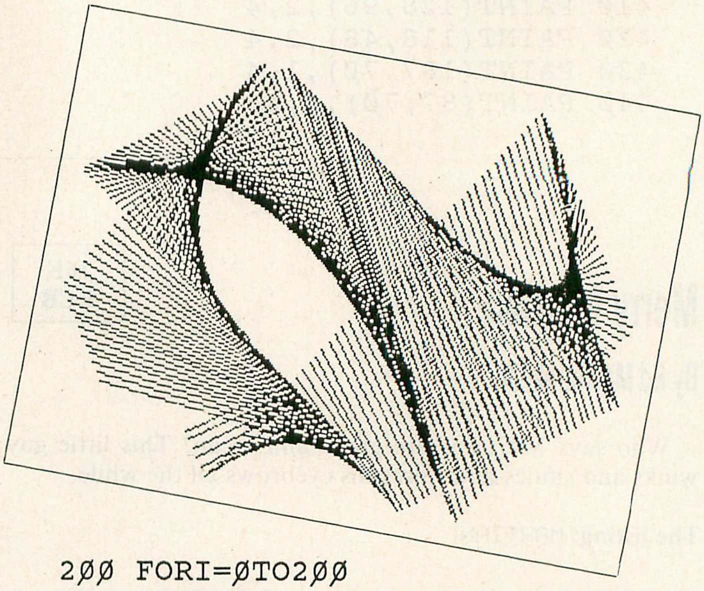
When saving a copy, don't enter an extension with the name; the program automatically adds `.ART` to the filename. It's the same when loading files, too.

Your files will consume three grans each. To save other `PMODE 4` screens to disk, use this command:

`SAVEM"`*name.ext*`",3584,9727,3584`

The listing: `COCOART`

```
10 GOTO90
20 FORJ=0TOM
30 POKE65495,0'HIGH SPEED
40 P(J)=P(J)+V(J)
50 IFP(J)<0THENP(J)=0:V(J)=-V(J)
60 IFP(J)>L(J)THENP(J)=L(J):V(J)
=-V(J)
70 NEXT
80 RETURN
90 CLEAR
100 DIMP(3),V(3),L(3)
110 PCLEAR4:PMODE4,1:PCLS5:SCREE
N1,1
120 L(0)=255:L(1)=191
130 L(2)=L(0):L(3)=L(1)
140 FORJ=0TO3
150 P(J)=RND(L(J))
160 V(J)=RND(0)*2-4
170 IFV(J)=0THENV(J)=1
180 NEXT
190 M=3
```



```
200 FORI=0TO200
210 GOSUB20
220 LINE(P(0),P(1))-(P(2),P(3)),
PRESET
230 NEXT
240 A$=INKEY$:IFA$=""THEN240
250 POKE65494,0'NORMAL SPEED
260 CLS:PRINT,,"      COCO GRAP
HICS DEMO","              MENU"
270 PRINT,,,,"      [1] SAVE IT","
[2] LOAD IT","      [3] VIEW IT","
[4] DRAW IT","      [5] DIR","  [6]
QUIT",,,,,,,"      ENTER OPTION
 NUMBER"
280 A1$=INKEY$:IFA1$=""THEN280
290 IFA1$="1"THENGOSUB380
300 IFA1$="2"THENGOSUB450
310 IFA1$="3"THENGOSUB490
320 IFA1$="4"THENGOSUB510
330 IFA1$="5"THENGOSUB520
340 IFA1$="6"THEN570
350 GOTO260
360 GOTO360
370 GOTO10
380 CLS:INPUT"GIVE IT A NAME";N$
390 IFN$=""THEN380
400 IF LEN(N$)>8THENPRINT"THAT'S
 TOO LONG":FORX=1TO500:NEXTX:GOT
O380
410 SAVEM N$+"/ART",3584,9727,35
84
420 PRINT"ITS DISK FILE NAME IS
```

```
";N$;"/ART"
 430 FORX=1TO4000:NEXTX
 440 GOTO260
 450 CLS:INPUT"WHAT'S ITS NAME";N
 1$
 460 IFN1$=""THEN450
 470 LOADM N1$+"/ART"
 480 GOTO260
 490 PMODE4,1:SCREEN1,1
 500 A2$=INKEY$:IFA2$=""THEN500EL
 SE260
 510 GOTO10
520 DIR
530 PRINT:PRINT"WITH";FREE(0); "
GRANULES REMAINING,"
540 PRINT"PRESS ANY KEY TO CONTI
NUE."
550 EXEC44539'HOLD UNTIL KEY IS
PRESSED
560 GOTO260
570 POKE113,0:EXEC40999'CLEARS O
UT MACHINE! LIKE TURNING IT OFF
AND THEN ON AGAIN!
```

Mirror Image

16K
ECB

By Keiran Kenny

Playing with this fun program is like creating a Rorschach test with an Etch-a-Sketch. After you finish drawing, you can give someone a personality test.

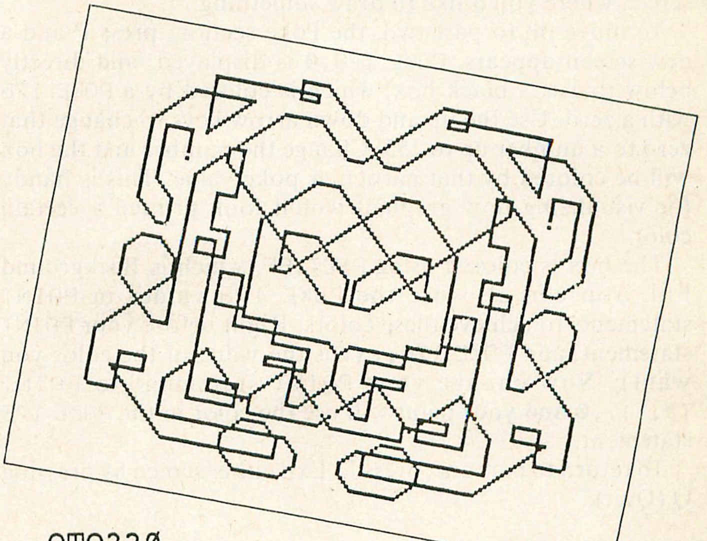
With this program, you can draw a picture in the right half of the graphics screen (128, 1-255, 191), and it will be repeated as a mirror image on the left half of the screen.

The program uses `PEEK(135)` and the keyboard. Use the arrow keys for up, down, left or right movement; Q for northwest; W for northeast; A for southwest; and S for southeast.

Start with a pixel set at 128,96. Pressing 1 gives you a flashing cursor, and 2 restores the pixel. Press 3 to save a picture and 4 to load a saved picture.

You need only press a direction key once, and your trace or cursor will continue moving in the chosen direction until you press another key. When your trace or cursor is at the edge of the screen or at horizontal position 128, it stops until you press another key.

The program only responds to direction keys that will move it along or away from the boundary of the graphics screen.



The listing: `MIRORPIX`

```
 0 'MIRORPIX': BY KEIRAN KENNY,
   THE HAGUE, 1987.
 10 PMODE4,1:COLOR0,5:PCLS:SCREEN
 1,1
 20 X=128:Y=96:H=128:V=96
 30 PSET(X,Y,0):GOTO90
 40 P=PEEK(135)
 50 IFX=128ANDP=65ORX=128ANDP=81O
 RX=128ANDP=8THENH=128:POKE135,0:
 GOTO220
 60 IFX=255ANDP=87ORX=255ANDP=83O
 RX=255ANDP=9THENH=1:POKE135,0:GO
 TO220
 70 IFY=1ANDP=81ORY=1ANDP=87ORY=1
 ANDP=94THENV=Y:POKE135,0:GOTO220
 80 IFY=191ANDP=65ORY=191ANDP=83O
 RY=191ANDP=10THENV=Y:POKE135,0:G
OTO220
90 IFP=94THENY=Y-1:V=Y
100 IFP=10THENY=Y+1:V=Y
110 IFP=8THENX=X-1:H=H+1
120 IFP=9THENX=X+1:H=H-1
130 IFP=65THENX=X-1:Y=Y+1:H=H+1:
V=Y
140 IFP=81THENX=X-1:Y=Y-1:H=H+1:
V=Y
150 IFP=87THENX=X+1:Y=Y-1:H=H-1:
V=Y
160 IFP=83THENX=X+1:Y=Y+1:H=H-1:
V=Y
170 IFP=49THENC=5
180 IFP=50THENC=0
190 IFP=51GOSUB230
200 IFP=52GOSUB240
210 IFC=5THENCOLOR0:LINE(X-1,Y-1
)-(X+1,Y+1),PSET,BF:COLORC:LINE(
X-1,Y-1)-(X+1,Y+1),PSET,BF:COLOR
0:LINE(H-1,V-1)-(H+1,V+1),PSET,B
F:COLORC:LINE(H-1,V-1)-(H+1,V+1)
,PSET,BF ELSEPSET(X,Y,C):PSET(H,
V,C)
220 GOTO40
230 POKE135,0:CSAVEM"",PEEK(&HBA
)*256,PEEK(&HB7)*256-1,&HB44A:RE
TURN
240 PCLS:POKE135,0:CLOADM:RETURN
```

16K
ECB

Prepare Before You Paint

By Bill Bernico

Poke 178 and Graphics Locator is a handy tool for graphics programmers.

Part one is the Locator section and uses the right joystick. Upon running, you'll see two numbers separated by a comma in the upper left-hand corner of the screen. Moving the joystick advances a cross-hair cursor around the screen. As it moves, the coordinates of that cursor will also change. Locator helps you estimate the approximate location on the screen where you'd like to draw something.

To move on to part two, the Poke section, press P and a new screen appears. `POKE 178,0` is displayed, and directly below that is a black box, which is colored by a `POKE 178` with a zero. Use the up and down arrow keys to change that zero to a number up to 255. Change the number and the box will be colored by that particular poke value. This is handy for visualizing how graphics would look printed a certain color.

The box is colored using `PSET,BF`, which is Background Fill. You can also use the `POKE 178` values in `PAINT` statements to achieve these colors. Right before your `PAINT` statement, add `POKE 178,`*v* (*v* is the value of the color you want). Now change your `PAINT` statement to `PAINT (X,Y),,0` and your paint will use the color in the `POKE 178` statement.

To return to part one, press L. Exit either screen by pressing Q (Quit).

The listing: `P178&GL`

```
1 'POKE 178 & GRAPHICS LOCATOR
   by Bill Bernico
2 DIMK$(57):C$="NU2ND2NL2NR2":M$
="BR4RDNGUBR":FORL=48TO57:READK$
(L):NEXT:DATA"BR4HU4ERFD4GNLBR2"
,"BR3R2U6NGD6R2","BR3BU5ER2FDG3L
DR4","BR3BU5ER2FDGNLFDGL2NHBR3",
"BR6U6G3R4BD3","BR3BUFR2EU2HL3U2
R4BD6","BR3BU3R3FDGL2HU4ER2BD6BR
","BR3BU6R4DG3D2BR3
3 DATA"BR4HUER2EUHL2GDFR2FDGNL2B
R","BR4R2EU4HL2GDFR3BD3":PMODE4,
1:PCLS1:SCREEN1,1:COLOR0,1
4 I$=INKEY$:IFI$="P"THEN7ELSEIFI
$="Q"THENCLS:END
5 POKE178,0:GOSUB6:H=INT(JOYSTK(
0)*4.049):V=INT(JOYSTK(1)*3.045)
:GOTO4
6 PCLS1:K$=STR$(H):DRAW"BM2,10":
GOSUB17:DRAW"BM27,10DNGU":K$=STR
$(V):DRAW"BM30,10":GOSUB17:DRAW"
BM=H;,=V;C0"+C$:RETURN
7 V=0:PCLS1:DRAW"BM50,20U8R4FD2G
L4D4BR10HU6ER4FD6GNL4BR6U8D4RNE4
F4BR4NR6U4NR4U4R6BM95,20RU6NGD6R
BR3BU6R4DG3D2BR7HUER2EUHL2GDFR2F
DGNL2BR3URDNLGBU5":LINE(59,39)-(
101,71),PSET,B
8 GOSUB16:POKE178,V:LINE(60,40)-
(100,70),PSET,BF
9 I$=INKEY$:IFI$=""THEN9
10 IFI$=CHR$(94)THENV=V+1
11 IFV>255THENV=0
12 IFI$=CHR$(10)THENV=V-1
13 IFV<0THENV=255
14 IFI$="L"THEN5ELSEIFI$="Q"THEN
CLS:END
15 GOTO8
16 POKE178,0:LINE(117,22)-(143,1
2),PRESET,BF:K$=STR$(V):DRAW"BM1
18,20C0":GOSUB17:RETURN
17 FORX=1TOLEN(K$):Y=ASC(MID$(K$
,X,1)):DRAWK$(Y):NEXT:RETURN
```

16K
ECB

How Cold Is It?

By Harvey Dettmann

Wind Chill is an accurate way to determine the wind chill temperature just by entering the temperature and wind velocity at the prompts. When you enter anything above 9 degrees Fahrenheit and a wind velocity, you get the wind chill. If you enter 9 degrees or lower with a wind velocity of 10 mph or more, you will get a little surprise! (Try entering 86 degrees with a wind velocity of 0, and you'll get another little surprise.)

The listing: `WINDCHIL`

```
10 '     WIND CHILL
20 ' ******************
30 ' * HARVEY DETTMANN *
40 ' *  SUSSEX, WIS.    *
50 ' *        53089     *
60 ' ******************
70 CLS
80 PRINT@40,"** WIND CHILL **"
90 PRINT:PRINT
100 INPUT "     TEMP (F): "; T :PR
INT:INPUT "   WIND VELOCITY:"; V
: IF V<4 THEN V = 4
110 C=((10.45 + (6.686112 * SQR(
V)) -(.447041 *V)) /22.034 *(T-9
1.4)) +91.4
120 PRINT
130 PRINT USING "    WINDCHILL ##
#.####";C
140 PRINT:PRINT
150 IF C<-10 THEN PRINT "  BR-R-
R C-C-C-COLD !!"
```

```
160 IF C>85 THEN PRINT "    HHHHH
-H O T   H O T "
170 PRINT
180 INPUT"  ANOTHER TRY (Y/N)";R
$
190 IF R$="Y"THEN 70 ELSE 200
200 CLS:PRINT@236,"e n d":GOTO 2
10
210 GOTO 210
```

Game

4K

It's a Touchdown!

By Darrel Behrmann

This program is a Simulation based on hand-held football games. The object is simply to score a touchdown.

The player is shown on the screen as an 'X', and the opposing team (controlled by the computer) is shown with dashes (--). Press the arrow keys to move the player up, down and across the screen. The player can't move backward.

The tacklers move toward the player at a rate determined by the level of difficulty you select. Two tacklers may occupy the same position simultaneously. Yards to go to a first down are shown at the top of the screen, while yards to a touchdown are shown below. Have fun!

The listing: `FOOTBALL`

```
0 'COPYRIGHT (C) 1987
  BY DARREL BEHRMANN
10 '****************************
20 '** FOOTBALL
30 '** BY DARREL BEHRMANN
40 '**     U-251 RD. 16 RT. 1
50 '**     NAPOLEON, OH 43545
60 '**     JANUARY 1987
70 '****************************
80 CLS:INPUT "EASY OR HARD (0-9)
";DF
90 YDS =80:DN=10:D=1
100 CLS
110 H=0:V=0:H(1)=3:V(1)=-1:H(2)=
3:V(2)=0:H(3)=3:V(3)=1:H(4)=5:V(
4)=0:H(5)=7:V(5)=0
120 FOR X=170 TO 181:PRINT @X,CH
R$(128);:NEXT:PRINT@202,CHR$(128
);:PRINT@234,CHR$(128);:PRINT@26
6,CHR$(128);:PRINT@213,CHR$(128)
;:PRINT@245,CHR$(128);:PRINT@277
,CHR$(128);:FORX=298 TO 309:PRIN
T@X,CHR$(128);:NEXT
130 PRINT @235+H+V*32,"X";
140 FOR X=1 TO 5:PRINT @235+H(X)
+V(X)*32,"-";:NEXT
150 PRINT@2,"YARDS TO GO :";DN:P
RINT @34,"DOWN NO :";D
160 PRINT@450,"YARD TO GO TO TOU
CHDOWN :";YDS
170 I$=INKEY$
180 OH=H:OV=V
190 IF I$="^" THEN IF V<>-1 THEN
 V=V-1
200 IF I$=CHR$(9) THEN YDS=YDS-1
:DN=DN-1:IF H<>9 THEN H=H+1 ELSE
 H=0
210 IF YDS=0 THEN SOUND 255,55:R
UN
220 IF DN<=0 THEN DN=0:MI=1
230 IF I$=CHR$(10) THEN IF V<>1
THEN V=V+1
240 PRINT@235+OH+OV*32," ";
250 FOR X=1 TO 5:IF H=H(X) AND V
=V(X) THEN SOUND 100,10:SOUND 1,
5:DN=DN+1:YDS=YDS+1:GOTO 290
260 NEXT X
270 IF RND(10-DF)=1 THEN GOSUB 3
30:'MOVE TACKLERS
280 GOTO 130
290 I$=INKEY$:'TACKLED
300 IF MI=0 THEN D=D+1:IF D=5 TH
EN SOUND 10,10:SOUND 1,5:CLS:PRI
NT YDS;" YARDS TO A TOUCHDOWN.":
D=1:YDS=80:INPUT "PRESS ENTER TO
 PLAY AGAIN";AN$:RUN
310 IF MI=1 THEN MI=0:DN=10:D=1
320 GOTO 100
330 MT=RND(5):HV=RND(2)
340 OH(MT)=H(MT):OV(MT)=V(MT)
350 IF HV=1 THEN IF H(MT)<H THEN
 H(MT)=H(MT)+1 ELSE IF H(MT)>H T
HEN H(MT)=H(MT)-1
360 IF HV=2 THEN IF V(MT)<V THEN
 V(MT)=V(MT)+1 ELSE IF V(MT)>V T
HEN V(MT)=V(MT)-1
370 PRINT@235+OH(MT)+OV(MT)*32,"
";
380 RETURN
```

Contributions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

Much Ado About Nothing

By Joseph Kolar
Rainbow Contributing Editor

Last month we took our first tentative steps to immerse ourselves into the vast, newly-discovered sea of CoCo 3 concepts. The water wasn't too deep, and we got a taste of things to come.

Our thesis for today is that, too often, we race through a tutorial, complete and save the results, and race off to chase down the next challenge, little realizing more challenges stalk us at the very instant we supposedly finish our last project.

We need to oil the squeaky cogs of our minds and use the resultant program as a stepping stone to greater creative efforts.

Type Listing 1. You may have saved it last month and squirreled it away. If so, save time — load and run it. Did you notice on the first trial, the screen was completely green? Only after pressing BREAK and typing `RUN` did the desired screen color emerge.

The three strips of text seem final. At first blush, it seems that except for relocating the lines, we can do nothing further to enhance, modify or improve our work. A creative dead end has been reached.

The three strips were placed near the top of the screen to keep the work in progress as near to eye level as practical. Relocating can wait until the program is set in concrete. Repositioning is a joy using the `LOCATE` statement.

If you pause to stare at the display and don't get mesmerized by the blinking strip, you may detect a flickering creative thought. You will find, as a newcomer to the CoCo 3, that revising an existing tutorial is very productive. You get additional practice to sharpen your new skills.

The first thing that came to mind was to replace my name with another. Since I love my name, the next idea was to restore it in place of the unsurping name. This is just another way to say "alternate two names."

The plan evolved! Without changing any colors of `KOKONUT1`, modify the program to alternate Joseph Kolar and Belinda Ramsey.

When working on a program, it is advisable to make frequent saves. After I give my first save a full name, each following modification uses only the first letter and a number for each succeeding save. If it is merely a variant of the previous one with no significant change, I add a letter. Thus, `K4A` is the fifth progression of `KOKONUT1` that is a renumbered version of `K4`. `K4B` is the sixth progression, but the multiple `LINE` statements were broken up into individual `LINE` statements. Type `61 PRINT" BELINDA RAMSEY";` and run.

This is Listing `K3A`, which indicates this is a slight modification, `A`, of the fourth modification, `3`, in the `KOKONUT`, `K`, series.

```
DEL199-
300 WIDTH40:LIST
100 GOTO100
```

Now run this. Belinda came out OK, but we lost Joseph. Type:

```
60 IF PEEK(343=191) THEN
   GOTO61 ELSE 62
62 PRINT" JOSEPH KOLAR";
```

Run this. All we get is Joseph. F1 doesn't do a thing.

Mask Line 60 with a `REM` and run. We get both names. Unmask Line 60. Now type `PRINT PEEK=(343)` and press ENTER.

We get 255, which is why we get Line 62. If F1 were pressed, it would be 191 and the CoCo would be directed to Line 61. We must find some way to activate Line 61.

At the end of Line 61, type:

```
:GOTO200 (We want to bypass
         Line 62.)
DEL100
199 IF PEEK(342)=191 THEN
    GOTO61 ELSE 200
200 IF PEEK(342)=191 THEN
    GOTO 62 ELSE 199
```

Now run and press CTRL. We are on the right track, even though it doesn't look like it. Line 199 tells us to type `GOTO61` to see if CTRL is pressed. If it isn't, type `GOTO200`. If it is pressed, type `GOTO62` or else go back to Line 199. In other words, CTRL must be pressed or the CoCo loops, patiently waiting for that happy event.

What we must do now is bring the two names into the red ribbon strip. `REM` both lines 40 and 50.

At the beginning of both lines 61 and 62, type `LOCATE11,5:ATTR4,7:`. Run and press CTRL. Repeat this a few times. Sometimes we get one or the other of the two names. The third ribbon of text

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

is shaky. Once in a blue moon, we get an orange background.

This is Listing `K`. Type `DEL40-50`.

In order to stop the third strip from quivering like jello, stabilize the display and get rid of the cursor after Belinda, in front of Line 200, type `LOCATE0,0:ATTR2,4:`. This moves the cursor away from the main display. Just to be safe and make sure we don't get an orange screen, in front of Line 199 type `ATTR2,4:` and run.

To use the ALT key for Belinda, change `342` to `341` in Line 200. Now run. Toggle between the CTRL and ALT keys. This is Listing `K1`.

Mask Line 50 and run. The third strip is missing until CTRL is pressed. This means we must relocate lines 61 and 62 after Line 90.

Rekey Line 61 as Line 91 and rekey Line 62 as Line 92. Type `DEL60-62`.

In Line 99 change `61` to `91`. In Line 200 change `62` to `92` and run. Type `RENUM10000,0,10` and run. This was done to avoid programming confusion, because the first digit of the line number falls off the screen on my TV. This is Listing `K2`.

Toggling back and forth gave me the idea to coordinate the blue strip with the orange strip by giving the blue strip a meaningful title. It didn't take much head-scratching to pick a pair of titles.

Since Belinda appeared after typing `RUN`, rekey `10050 " TUTORIAL FOR BELINDA";`. Start with two blank spaces to maintain symmetry. Now run. It looks good. Toggle between the CTRL and ALT keys.

It finally dawned on me that I needed two parallel constructions to keep Joseph and Belinda separate.

Edit Line 10090 to insert at the beginning the information embedded in lines 10030 to 10050. Type `10090 LOCATE8,2:ATTR3,2,B:PRINT" TUTORIAL FOR BELINDA`. Now run.

Edit Line 10100 and insert at the beginning the hot scoop from lines 10030 to 10050 — except change `BELINDA` to `JOSEPH`. Leave a blank trailing space after `JOSEPH` and don't forget to insert a colon (:) between each statement in the new line. Now run. Type `DEL10030-10050` and run. This is Listing `K3`.

Type `DEL10110`. In front of Line 10120, type `LOCATE0,0:` and run. This is Listing `K3A`, which indicates this is a slight modification, `A`, of the fourth modification, `3`, in the `KOKONUT`, `K`, series.

All we must do now is add the information in lines 10060 to 10080 to the end of Line 10100.

Add the following to Line 10100: `LOCATE8,8:ATTR2,4:PRINT" INVERNESS, FL., 32650";` and run.

In Line 10090, in front of `:GOTO 10130`, type `LOCATE8,8:ATTR2,4:PRINT" HERNANDO,FL., 32642"`. Note two blank spaces in front of the ZIP. Now run.

Type `DEL10060-10080` and run. Note that you always check your work to see if it is OK — before you delete supposedly redundant program lines. This is Listing `K4`.

Type `RENUM0,10000,10` and run. This is Listing `K4H`.

If you want to view the listing in the regular 32-by-16 text format, simply type `WIDTH32`, press ENTER and type `LIST`.

Since the high program line numbers tend to confuse, Listing `K4A` is merely a more acceptable line numbering sequence. It is a condensed, multiple `LINE` statement program.

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For the newcomer KoKonuts, or should I say *CoConauts*, who find multiple LINE statements uncomfortable to handle, K4B is broken down into one statement per program line.

You should be able to dope it out and follow the action. You will be struck with how simple the program really is. Outside of being aware that the program isn't earth-shattering, you may wonder, why K4B wasn't created in the first place.

Sad to say, but the obvious solution eluded me. Only through trial and error did I manage to get on the right track, and even then I had to grope around seeking the best way to make it work to my satisfaction. It was fun solving each small problem that inexorably advanced to its completion.

When I looked at KOKONUT1, I didn't foresee the final product. Each vaguely defined idea gradually coalesced until a definite program was envisioned. Once the end product was conceptualized, it was a matter of working stubbornly toward the goal. You were left to your own initiative to save or not to save any of the intervening listings we developed.

For your homework assignment, from what you have discovered in last month's tutorial, substitute the F1 and F2 keys to flip back and forth between displays.

If you are a glutton for punishment, type in TRON, press ENTER and study K4B. You will see some jittery line numbers in brackets at the top of the display. Press CTRL and hold it. You will be able to compare the bracketed line numbers with Listing K4B. It starts out waiting for a key to be pressed. One or the other must be pressed. The default is the Belinda display, which skirts the Joseph one with the GOTO30 instruction. Can you trace the routes that the program took?

To come full circle and convert K4B on the CoCo 3 to the Lo-Res, 32-by-16 text screen and make an equivalent program, type 20 WIDTH32 and run.

It was relatively easy to convert the program. Whatever lines bombed out, the CoCo began from the beginning of the listing and rewarded me with an HP Error message (Hi-Res print error). I edited the guilty line to an equivalent Lo-Res statement (i.e., PRINT@*x*,""; in place of LOCATE*a*,*b*).

X was determined by trial and error and the lines adjusted to maintain symmetry. These were the changes I made:

Lines 31 and 40, type PRINT@37,"";
Lines 33 and 43, type PRINT@104,"";
Lines 36 and 46, type PRINT@165,"";
Lines 32 and 42, remove one space at the beginning.
Lines 35 and 45, take out one space between the names.
Line 38, remove one space before the ZIP number.
Line 45, insert one space at the end.
Line 48, remove the period.
Lines 50 and 60, mask with REM and run.

Note: ATTR statements are ignored by the CoCo 3. Remarked, Hi-Res lines are harmless. If you have a CoCo 3, you may use the ALT, CTRL, F1 and F2 keys in the 32-by-16 mode.

Type 29 CLS3. In front of Line 40, type CLS4:. Delete lines 31, 34, 37, 41, 44, 47, 51 and 61. In Line 52, change 30 to 25 and run. This is Listing K5.

The program could have been refined further by making Line 32 begin with PRINT@37, instead of PRINT and DEL30 and so forth. Make all the required changes. Type DEL50 and DEL60. In lines 39 and 52, change 60 to 62. This is Listing K6.

The enterprising CoCo 3 owner will want to convert K6 so owners of older CoCo models can view the unvarnished version.

Compare listings K6 and K7. Lines 10 and 20 were both killed because older CoCo models did not understand the CoCo 3 statements. Now run.

Lines 32 and 35 added the final blank space, and Line 38 had the period removed. Moving to the other display, Line 48 was relocated one unit to the left; the period was edited out; a final blank space was added.

Do you recall that last month it was brought to your attention that in a PRINT statement the CoCo 3 automatically adds a final blank space if the semicolon is used? This is not the case with the older models; therefore, we had to realign the characters.

Type DEL52-62. These lines were unintelligible to older versions of the CoCo 3. To parody these missing keys, ALT and CTRL, the INKEY$ function was substituted. If the up arrow key was pressed, the CoCo was instructed to display Belinda, and if the SHIFT and up arrow keys were pressed, then Joseph would be displayed. If the @ key was tapped, the program would be listed. If no keys were pressed, the CoCo would wait patiently for some instruction.

Finally, Line 39 was changed, after the initial display of Belinda, to go to INKEY$ to await the user's pleasure.

When I printed the listing from the CoCo 3, Line 53, the left arrow was printed as an underline in the listing on my printer. This is Listing K7.

Looking back at what we created, it sure isn't impressive. In fact, it is downright mundane. This tutorial is much ado about nothing. Thanks to the ado, I hope you have enjoyed the jaunt through some of CoCo's features and had a productive learning experience. □

Listing 1:

```
0 '<KOKONUT1>
5 ON BRK GOTO300
10 WIDTH40
16 LOCATE8,2
20 ATTR 3,2,B
30 PRINT" Tutorial For Kokonuts"
;
40 LOCATE11,5
50 ATTR4,7
60 PRINT"  JOSEPH  KOLAR ";
70 LOCATE8,8
80 ATTR2,4
90 PRINT" INVERNESS, FL., 32650"
;
95 LOCATE0,0
199 IF PEEK(341)=191 THEN LOCATE
 12,11 ELSE IF PEEK(342)=191 THE
N LOCATE 12,15 ELSE GOTO 199
200 PRINT"  HELLO THERE! ";:LOCA
TE0,0
201 IF PEEK(343)=191 THEN RUN EL
SE IF PEEK(344)=191 THEN LIST EL
SE 201
300 WIDTH32:LIST100-
```

NAME THE OWL CONTEST

During September 1987 OWL-WARE is 5 years old! Our current owl logo was first formed in October of that year. Now that our logo is five years, someone said it should have a name. We don't know if the owl is a he, she, or it. You help us decide! Rules are as follows:

1. All *entries must be is writing* and received by Oct. 8, 1987 or at Rainbowfest Oct. 9 or 10. *No phone entries.*
2. All entries becomes the property of OWL-WARE, and owl names will be used in ads as we wish.
3. No purchase necessary.
4. To win you must be the first entry of a selected name. There will be 4 *different* names winning prizes.
5. At least one of the winning names will be selected from an entry at Rainbowfest.
6. Prizes will be in OWL-WARE gift certificates as follows: 1st $250, 2nd $100, 3rd. $50, and $50 from Rainbowfest entries only.
7. Winners will be announced at Rainbowfest Oct. 11.

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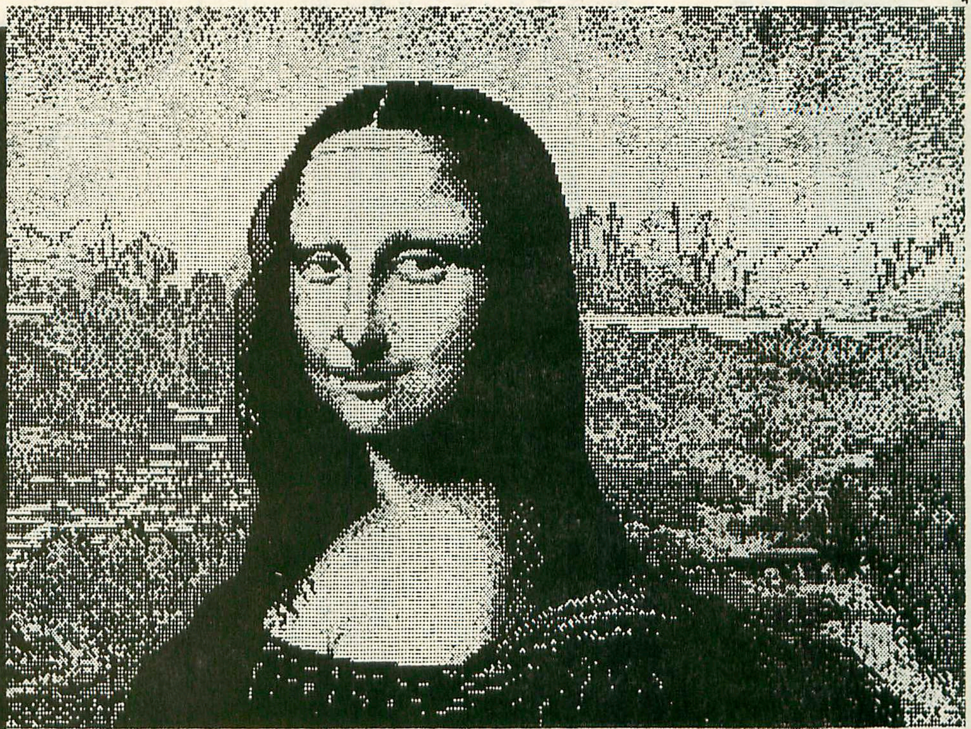

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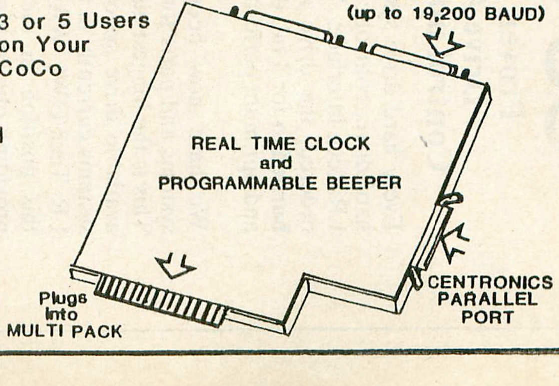

FULL
DETAILS
NEXT
PAGE

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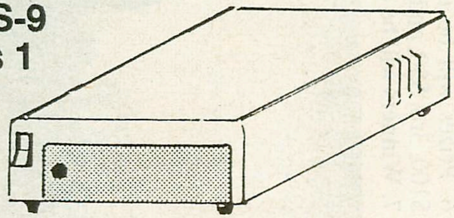
For OS-9 Levels 1 and 2



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$599.	$699.	New RLL System! $829.
10 MEG	20 MEG	30 MEG

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Listing 2:

```
0 '<K>
5 ON BRK GOTO300
10 WIDTH40
16 LOCATE8,2
20 ATTR 3,2,B
30 PRINT" Tutorial For Kokonuts"
;
40 'LOCATE11,5
50 'ATTR4,7
60 IF PEEK(343)=191 THEN GOTO61
ELSE 62
61 LOCATE11,5:ATTR4,7:PRINT" BEL
INDA  RAMSEY";:GOTO200
62 LOCATE11,5:ATTR4,7:PRINT"  JO
SEPH  KOLAR";
70 LOCATE8,8
80 ATTR2,4
90 PRINT" INVERNESS, FL., 32650"
;
95 LOCATE0,0
199 IF PEEK(342)=191 THEN GOTO61
 ELSE 200
200 IF PEEK(342)=191 THEN GOTO62
 ELSE 199
300 WIDTH40:LIST
```

Listing 3:

```
0 '<K1>
5 ON BRK GOTO300
10 WIDTH40
16 LOCATE8,2
20 ATTR 3,2,B
30 PRINT" Tutorial For Kokonuts"
;
60 IF PEEK(343)=191 THEN GOTO61
ELSE 62
61 LOCATE11,5:ATTR4,7:PRINT" BEL
INDA  RAMSEY";:GOTO200
62 LOCATE11,5:ATTR4,7:PRINT"  JO
SEPH  KOLAR";
70 LOCATE8,8
80 ATTR2,4
90 PRINT" INVERNESS, FL., 32650"
;
95 LOCATE0,0
199 ATTR2,4:IF PEEK(342)=191 THE
N GOTO61 ELSE 200
200 LOCATE0,0:ATTR2,4:IF PEEK(34
1)=191 THEN GOTO62 ELSE 199
300 WIDTH40:LIST
```

Listing 4:

```
10000 '<K2>
10010 ON BRK GOTO10140
10020 WIDTH40
10030 LOCATE8,2
10040 ATTR 3,2,B
10050 PRINT" Tutorial For Kokonu
ts";
10060 LOCATE8,8
10070 ATTR2,4
10080 PRINT" INVERNESS, FL., 326
50";
10090 LOCATE11,5:ATTR4,7:PRINT"
BELINDA  RAMSEY";:GOTO10130
10100 LOCATE11,5:ATTR4,7:PRINT"
 JOSEPH  KOLAR";
10110 LOCATE0,0
10120 ATTR2,4:IF PEEK(342)=191 T
HEN GOTO10090 ELSE 10130
10130 LOCATE0,0:ATTR2,4:IF PEEK(
341)=191 THEN GOTO10100 ELSE 101
20
10140 WIDTH40:LIST
```

Listing 5:

```
10000 '<K3>
10010 ON BRK GOTO10140
10020 WIDTH40
10060 LOCATE8,8
10070 ATTR2,4
10080 PRINT" INVERNESS, FL., 326
50";
10090 LOCATE8,2:ATTR3,2,B:PRINT"
 Tutorial For Belinda";:LOCATE1
1,5:ATTR4,7:PRINT" BELINDA  RAMS
EY";:GOTO10130
10100 LOCATE8,2:ATTR3,2,B:PRINT"
 Tutorial For Joseph ";:LOCATE1
1,5:ATTR4,7:PRINT"  JOSEPH  KOLA
R";
10110 LOCATE0,0
10120 ATTR2,4:IF PEEK(342)=191 T
HEN GOTO10090 ELSE 10130
10130 LOCATE0,0:ATTR2,4:IF PEEK(
341)=191 THEN GOTO10100 ELSE 101
20
10140 WIDTH40:LIST
```

Listing 6:

```
10000 '<K3A>
10010 ON BRK GOTO10140
10020 WIDTH40
10060 LOCATE8,8
10070 ATTR2,4
10080 PRINT" INVERNESS, FL., 326
50";
10090 LOCATE8,2:ATTR3,2,B:PRINT"
 Tutorial For Belinda";:LOCATE1
1,5:ATTR4,7:PRINT" BELINDA  RAMS
EY";:GOTO10130
10100 LOCATE8,2:ATTR3,2,B:PRINT"
 Tutorial For Joseph ";:LOCATE1
1,5:ATTR4,7:PRINT"  JOSEPH  KOLA
R";
10120 LOCATE0,0:ATTR2,4:IF PEEK(
342)=191 THEN GOTO10090 ELSE 101
30
10130 LOCATE0,0:ATTR2,4:IF PEEK(
341)=191 THEN GOTO10100 ELSE 101
20
10140 WIDTH40:LIST
```

Listing 7:

```
10000 '<K4>
10010 ON BRK GOTO10140
10020 WIDTH40
10090 LOCATE8,2:ATTR3,2,B:PRINT"
 Tutorial For Belinda";:LOCATE1
1,5:ATTR4,7:PRINT" BELINDA  RAMS
EY";:LOCATE8,8:ATTR2,4:PRINT" HE
RNANDO, FL.,   32642 ";:GOTO10130
10100 LOCATE8,2:ATTR3,2,B:PRINT"
 Tutorial For Joseph ";:LOCATE1
1,5:ATTR4,7:PRINT"  JOSEPH  KOLA
R";:LOCATE8,8:ATTR2,4:PRINT" INV
ERNESS, FL., 32650";
10120 LOCATE0,0:ATTR2,4:IF PEEK(
342)=191 THEN GOTO10090 ELSE 101
30
10130 LOCATE0,0:ATTR2,4:IF PEEK(
341)=191 THEN GOTO10100 ELSE 101
20
10140 LIST
```

Listing 8:

```
0 '<K4A>
10 ON BRK GOTO70
20 WIDTH40
30 LOCATE8,2:ATTR3,2,B:PRINT" T
utorial For Belinda";:LOCATE11,5
:ATTR4,7:PRINT" BELINDA  RAMSEY"
;:LOCATE8,8:ATTR2,4:PRINT" HERNA
NDO, FL.,   32642 ";:GOTO60
40 LOCATE8,2:ATTR3,2,B:PRINT" T
utorial For Joseph ";:LOCATE11,5
:ATTR4,7:PRINT"  JOSEPH  KOLAR";
:LOCATE8,8:ATTR2,4:PRINT" INVERN
ESS, FL., 32650";
50 LOCATE0,0:ATTR2,4:IF PEEK(342
)=191 THEN GOTO30 ELSE 60
60 LOCATE0,0:ATTR2,4:IF PEEK(341
)=191 THEN GOTO40 ELSE 50
70 LIST
```

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Listing 9:

```
0 '<K4B>
10 ON BRK GOTO70
20 WIDTH40
30 LOCATE8,2
31 ATTR3,2,B
32 PRINT"  Tutorial For Belinda"
;
33 LOCATE11,5
34 ATTR4,7
35 PRINT" BELINDA  RAMSEY";
36 LOCATE8,8
37 ATTR2,4
38 PRINT" HERNANDO, FL.,  32642
";
39 GOTO60
40 LOCATE8,2
41 ATTR3,2,B
42 PRINT"  Tutorial For Joseph "
;
43 LOCATE11,5
44 ATTR4,7
45 PRINT"  JOSEPH  KOLAR";
46 LOCATE8,8
47 ATTR2,4
48 PRINT" INVERNESS, FL., 32650"
;
50 LOCATE0,0:
51 ATTR2,4
52 IF PEEK(342)=191 THEN 30 ELSE
 60
60 LOCATE0,0
61 ATTR2,4
62 IF PEEK(341)=191 THEN 40 ELSE
 50
70 LIST
```

Listing 10:

```
0 '<K5>
10 ON BRK GOTO70
20 WIDTH32
29 CLS3
30 PRINT@37,"";
32 PRINT" Tutorial For Belinda";
33 PRINT@104,"";
35 PRINT" BELINDA RAMSEY";
36 PRINT@165,"";
38 PRINT" HERNANDO, FL, 32642 ";
39 GOTO60
40 CLS4:PRINT@37,"";
42 PRINT" Tutorial For Joseph ";
43 PRINT@104,"";
45 PRINT"  JOSEPH KOLAR ";
46 PRINT@165,"";
48 PRINT" INVERNESS, FL, 32650";
50 'LOCATE0,0
52 IF PEEK(342)=191 THEN 29 ELSE
 60
60 'LOCATE0,0
62 IF PEEK(341)=191 THEN 40 ELSE
 52
70 LIST
```

Listing 11:

```
0 '<K6>
10 ON BRK GOTO70
20 WIDTH32
29 CLS3
32 PRINT@37," Tutorial For Belin
da";
35 PRINT@104," BELINDA RAMSEY";
38 PRINT@165," HERNANDO, FL, 326
42 ";
39 GOTO62
40 CLS4
42 PRINT@37," Tutorial For Josep
h ";
45 PRINT@104,"  JOSEPH KOLAR ";
48 PRINT@165," INVERNESS, FL, 32
650";
52 IF PEEK(342)=191 THEN 29 ELSE
 62
62 IF PEEK(341)=191 THEN 40 ELSE
 52
70 LIST
```

Listing 12:

```
0 '<K7>
10 '
20 '
29 CLS3
32 PRINT@37," Tutorial For Belin
da ";
35 PRINT@104," BELINDA RAMSEY ";
38 PRINT@165," HERNANDO, FL., 32
642 ";
39 GOTO50
40 CLS4
42 PRINT@37," Tutorial For Josep
h ";
45 PRINT@104,"  JOSEPH KOLAR ";
48 PRINT@164," INVERNESS, FL., 3
2650 ";
50 A$=INKEY$
51 IF A$="^" GOTO29
53 IF A$="_" GOTO40' <SHIFT> <^>
54 IF A$="@" GOTO 70 ELSE 50
70 LIST
```

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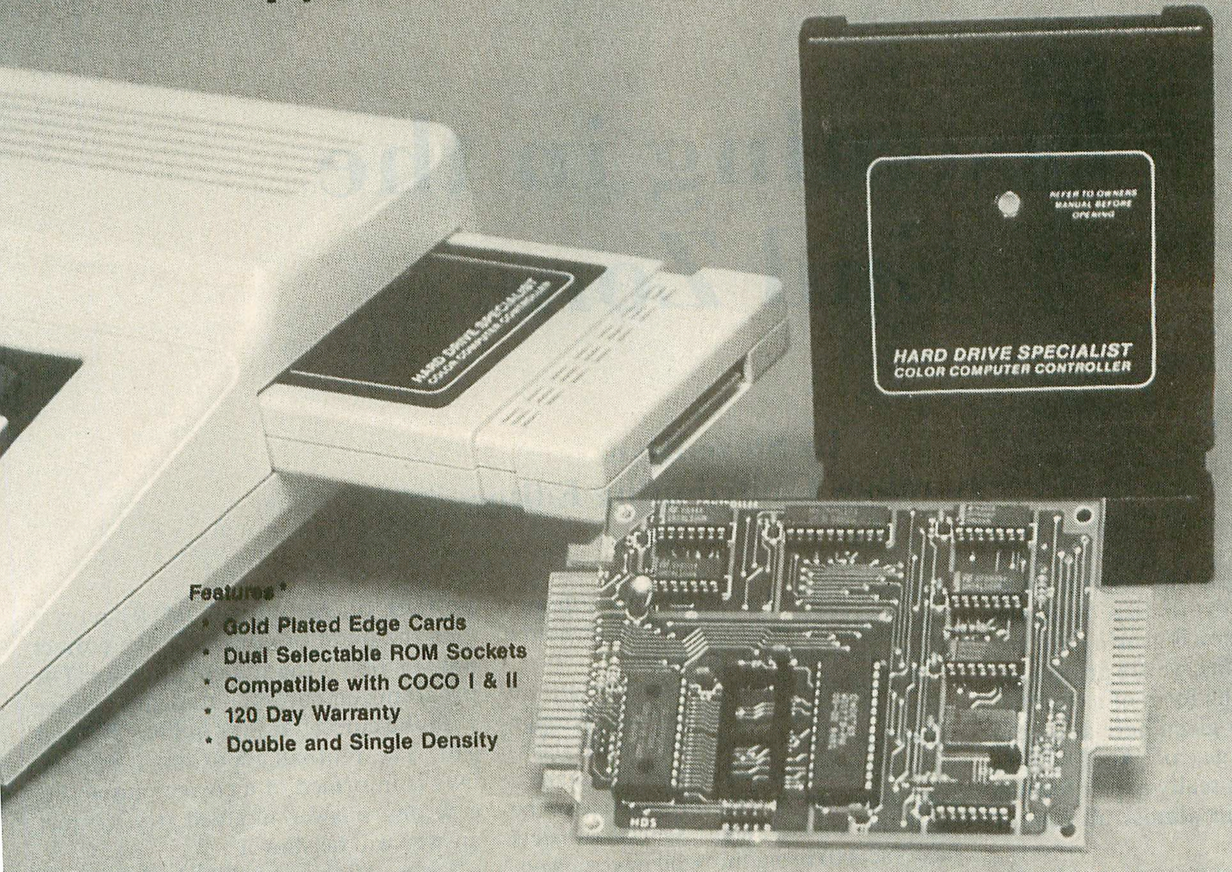
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Learning in the End Zone

By Steve Blyn
Rainbow Contributing Editor

Fear not, sports fans! As the baseball season draws to a close, the football season is gearing up. For our junior sports fans, we are presenting a learning tool in the form of a football game. *Blitz Quiz* is given here as a quiz testing knowledge of the Color Computer, but it is really a quiz format that can be used in almost all school subject areas.

Blitz Quiz is an entertaining way for students to review information to be learned, memorized or reviewed. We have used this program with greatly varied data for students of all ages.

Computers are wonderfully convenient tools that can easily catch the interest of children through their senses. The more methods we have to present material, the more likely it is to be absorbed. I have long felt that new computer approaches in presenting familiar material often provide the spark that piques a reluctant student's interest to finally learn a topic.

We have included 20 questions in a short computer terms quiz. You may increase the number of questions by adding more data pairs in extra `DATA` lines. You must also be certain to adjust that amount in Line 30, which contains the variable `Z` telling the computer how many `DATA` groups there are.

"Computer terms" is merely one of many topics that you may use. Foreign language words or phrases, math flashcard facts or social studies facts are a few other areas this program can be used for. In fact, most school subjects have facts to be memorized or reviewed, and they can be applied to this program.

The game shows the outline of a football field similar to the one below. It is drawn by lines 100 to 210.

The football is represented by an asterisk, and is initially placed at the 50 yard line by Line 220. CoCo asks a question, and the student enters an answer. If the student answers correctly, the ball moves toward the goal line. If the student is incorrect, the ball moves a loss of 10 yards in the opposite direction. The game is over when the ball reaches either the goal or the other end of the field.

The variable `A` represents the current position of the football. `A$(R)` represents the question. `B$(R)` is the correct answer. `AN$` is the student's answer. The program compares the student's answer with the correct answer in lines 300 and 310. The football repositions and the user is informed of a correct answer. If a wrong answer is given, the correct answer will be shown.

Lines 380 through 390 check to see if the ball has reached either end of the field, ending the game. After each game, the user may press either the G key to play again or the E key to end the program.

We hope you find many uses for *Blitz Quiz*. It is a good idea to save the program before you want to change the contents. Then you merely replace old data with your new data to have a new program. You may repeat this procedure as often as there is new information to be learned. We at Computer Island hope your children have fun and learn, too, while scoring touchdowns. ☐

```
      10    20    30    40    50    40    30    20    10

!     !     !     !     !     !     !     !     !     !     !
!     !     !     !     !     !     !     !     !     !     !    G
!     !     !     !     !     *     !     !     !     !     !    O
!     !     !     !     !     !     !     !     !     !     !    A
!     !     !     !     !     !     !     !     !     !     !    L
```

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: CCBLITZ

```
10 REM"EDUCATIONAL FOOTBALL QUIZ
"
20 REM"STEVE BLYN,COMPUTER ISLAN
D SOFTWARE,STATEN ISLAND,NY,1987
30 Z=20
40 DIM A$(Z),B$(Z)
50 FOR Y=1 TO Z:READ A$(Y),B$(Y)
:NEXT Y
60 A=303:R=RND(-TIMER)
70 CLS0
80 PRINT@0,STRING$(32,239);
90 PRINT@8,"FOOTBALL  QUIZ";
100 REM SET UP THE FOOTBALL FIEL
S
110 FOR T=1216 TO 1408 STEP 32:P
OKE T,159:NEXT T
120 FOR T=1246 TO 1438 STEP 32:P
OKE T,159:NEXT T
130 FOR T=1216 TO 1246:POKE T,14
7:NEXT T
140 FOR T=1408 TO 1438:POKE T,15
6:NEXT T
150 FOR T=1251 TO 1277 STEP 3:PO
KE T,149:NEXT T
160 FOR T=1283 TO 1308 STEP 3:PO
KE T,149:NEXT T
170 FOR T=1315 TO 1340 STEP 3:PO
KE T,149:NEXT T
180 FOR T=1347 TO 1372 STEP 3:PO
KE T,149:NEXT T
190 FOR T=1379 TO 1404 STEP 3:PO
KE T,149:NEXT T
200 FOR T=1279 TO 1407 STEP 32:P
OKE T,207:NEXT T
210 PRINT@160,"  10 20 30 40 50
 40 30 20 10"
220 PRINT@A,"*";
230 PRINT@64,"":PRINT@96,""
240 REM ASK A QUESTION
250 PRINT@64,"":PRINT@96,""
260 R= RND(Z)
270 PRINT@64,A$(R)
280 PRINT@96,"? ";
290 LINE INPUT AN$
300 IF AN$=B$(R) THEN PLAY"L100C
EGG":A=A+3:PRINT@428,"CORRECT";
310 IF AN$<>B$(R) THEN PLAY "L10
C":A=A-3:PRINT@428,B$(R);
320 EN$=INKEY$
330 IF EN$=CHR$(13) THEN 340 ELS
E 320
340 PRINT@416,STRING$(32,128);
350 FOR T=1315 TO 1340 STEP 3:PO
KE T,149:NEXT T
360 PRINT@A,"*";
370 REM CHECK FOR END OF GAME
380 IF A=288 THEN PRINT@456,"SOR
RY,GAME OVER";
390 IF A=318 THEN PRINT@425,"TOU
CHDOWN !!!";:PLAY"L150CEGGFEDCCC
"
400 IF A=288 OR A=318 THEN 410 E
LSE 240
410 PRINT@489,"PRESS g OR e ";
420 EN$=INKEY$
430 IF EN$="G" THEN RUN ELSE IF
EN$="E" THEN END ELSE 420
440 DATA ALLOWS INSERTIONS OF CO
MMENTS,REM,PUT BACK ALL OF TTHE
READ DATA,RESTORE,EXECUTES A PRO
GRAM,RUN,TURNS ON THE PROGRAM TR
ACER,TRON
450 DATA LOADS A MACHINE LANGUAG
E TAPE,CLOADM,CLEARS THE SCREEN,
CLS,TRANSFER CONTROL TO M/L PROG
RAM,EXEC
460 DATA PRINT THE AMOUNT OF FRE
E MEMORY,PRINTMEM,TELL CONTENTS
OF MEMORY LOCATION,PEEK,INPUT DA
TA FROM A CASSETTE,INPUT#-1
470 DATA CALLS A SUBROUTINE,GOSU
B,JUMPS TO A LINE NUMBER,GOTO,AS
SIGNS VALUE TO A VARIABLE,LET
480 DATA LISTS PROGRAM TO A PRIN
TER,LLIST,TURNS CASSETTE ON,MOTO
RON,ERASES EVERYTHING IN MEMORY,
NEW,RESERVES GRAPHIC PAGES,PCLEA
R
490 DATA PUTS VALUES INTO LOCATI
ONS,POKE,SELECTS DEGREE OF RESOL
UTION,PMODE,PRINTS ITEMS ON A PR
INTER,PRINT#-2
```

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SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, which appears bimonthly, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

In response to letters from:

- Howard Larsen: To get past the anaconda in *Dallas Quest*, try typing `TICKLE ANACONDA` and see what happens.

Michael Jones
Mobile, AL

- John Tiffany: In *Polynesian Adventure*, to get the hot knife, go to the lagoon and fill the gas can by typing `FILL CAN`. Then go to the room with the hot knife and type `POUR CAN`.

In *Search for the Ruby Chalice*, to stop the wildcat, get the gun from your base camp. When it leaps at you, type `SHOOT GUN`.

In *Dr. Avaloe*, to get out of the first room, type `LOOK HOLE`. After its response, type `DOWN HOLE`.

Fred Reiss
McAlester, OK

- Thomas Payton: If you are talking about the locked room where you first find the 5-Bota token in *Robot Odessey*, grab the key with the top-most part of the cursor, unlock the door, drop the key and ride inside the robot, rewiring as you go along.

If you are talking about after the coin falls through the slot, this is how to do it. When the turnstile starts moving, get through as fast as possible. When you need the token again, start the robot with the wallcrawler chip hooked up inside it at the upper-right corner with the grabber connected. Grab whatever it touches, and get to the lower left-hand corner. The exit ticket is at the laundrobot station.

How do I get through the Master Control Center of *Robot Odessey I*? I've pressed the first button, but I can't get any farther.

Alex Beckers
Middletown, RI

- Erik Yoder: To fill the pool in *Hall of the King*, you need the bucket. First you must repair the bucket and go to the kitchen to fill it.

D. Harold Kruse
Peoria, IL

- Dianne Piper: To get on the train to Paris in the *Interbank Incident*, you have to get a ticket. After you get a ticket, point the arrow at the foot and then at f (forward).

How do you get to the ghost town?

James Carr
Twin Falls, ID

- Neil Johnson: In *Pyramid*, you don't have to change the batteries. Just buy them and the computer will change them when it wants to.

How do you find the mummy's chest in the maze, and do you use the scepter?

Chad Glover
Absecon, NJ

- Joseph Delaney: To get the powerful Kulcad spell in *Enchanter*, go out through the south gate and go to the beach. Use the Nitefall spell on the turtle and ask him to follow you. Then go to the engine room in the tower. Cast the EXEX spell on the turtle and type `TURTLE`. Go southeast and get the scroll. Go northwest and the obedient rainbow-hued turtle will retrieve the scroll for you.

Is it possible to get the adventurer to help you?

Barret Kelley
Kerrville, TX

- Troy Phelps: In *Dallas Quest*, to get the shovel you must first give the sunglasses to the owl. The owl will come to you and you should then go into the barn and the owl will eat the rat.

- Domenick Doran: In *Dallas Quest*, to get past the cannibals by the cave, you have to type `WAVE RING`.

- Jeff Hurteau: In *Dallas Quest*, to get all the inventory down the ladder, you must take one item down at a time (take the flashlight first) and find the direction for the village. Then take one item down at a time and drop it. Repeat these steps until the rest of the items are downstairs. Remember to turn the flashlight off when you're done!

Roger Rosebrock
Leipsic, OH

- Jeff Stewart: In *Wrestle Maniac*, when your opponent is on the mat, stand your man over him, hold down the button and pull the joystick back.

In *Sands of Egypt*, type `HELP` for each object you find.

What does the shovel remind you of?

In *One-On-One*, how do you get 3-pointers and how do you do a backwards slam?

Eric Reitz
Mendham, NJ

- Rick Moore: To get past the dog in *Bedlam*, first you have to get the blue pill in the dispensary. Next, open the refrigerator and get the hamburger meat that falls on the floor. Put the blue pill in the meat and feed it to the dog.

How do you get the green key?

Thomas Overmyer
Round Lake Beach, IL

Scoreboard:

In *Dungeons of Daggorath*, to kill the blobs, you must hit them with your sword quite a few times, or use an ice ring.

In *Dallas Quest*, to get past the anaconda, you must tickle him. Also, when you get to the crossroads, grab the coconuts and go to the screen with the bird's nest. To stop the boat from leaking, give some tobacco to the monkey.

In *Trekboer*, you must refill the beaker with acid and pour the acid on the grate.

In *Calixto Island*, you must take the pottery to the professor's study. Make sure you take the tire pump with you when you go to the island. Also, to get past the jungle edge, you must cut the foliage with the machette that you trade either the rug or the chest for.

To bend the bars in *Hall of the King I*, you must get the key piece. You will find the key piece in a room hidden behind the fermented grain. You must burn the grain, then go into the room. In the room there is a pedestal surrounded by beams of light. Reflect the light off of the mirror and take it from there. You will need the vile of acid.

In *Black Sanctum*, to get past the cabin, you must walk through the mirror. Make sure you have the robe first.

In *Sea Quest*, how do you buy the diving equipment and how do you get past the pirate?

Jared Brookes
Alberta, Canada

Scoreboard:

To get through the bronze doors in *Dragon's Blade*, go to the grave and dig to get the key.

To use the scroll, you must go into the room with the gargoyle and type `SAY KASSAMAY`.

How do you get past the tunnel?

Richard Deane
Chicago, IL

Scoreboard:

How do you get past the green fierce monster in *Pyramid 2000*?

Marc Hodgson
Georgetown, Ontario

Scoreboard:

How do you get past the serpent in *Pyramid 2000*?

Brian Ferro
Burke, VA

Scoreboard:

In *Dallas Quest*, when I get to the tunnel under the trap door at the trading post, it says to turn on the flashlight. Where do I get the flashlight?

In *Hall of the King III*, what must I do to get past the snake in the hole on the river bank?

Robert Taylor
Yuma, AZ

Scoreboard:

In *Dallas Quest*, ask the parrot; he'll tell you a way to avoid being eaten by the anaconda; try the shovel as an oar; bribe the monkey and the boat won't sink; at the crossroads, go to mama vulture and get her eggs.

In *Sands of Egypt*, you'll have to dig for the magnifier and torch. To leave the underground passage, get underneath the exit and untie the rope, drop and climb the ladder. Ride only *once* from the pool and you will end up at the pyramid. To empty the pool, type `HOOK SCEPTER TO HANDLE` and `PULL SCEPTER`.

Beware: If you use the canteen in any way, except for drinking, you will automatically drop it!

Duane Whitlock
North East, MD

Scoreboard:

Anytime you want to restart play in *Wrestle Maniac*, press the R key. If you want to have a demonstration of the game running, press the D key at the single players or teams prompt.

David Kauffman
South Haven, MI

Scoreboard:

In *Sands of Egypt*, I have the drain open, but I cannot find the torch to enter the hole.

John Barsh
Strykersville, NY

Scoreboard:

In *Sands of Egypt*, where are the dates and the pool?

Jason Jasmin
Margate, FL

Scoreboard:

In *Raaku-Tu*, how do you get across the rug to the carved door on the other side?

In *Dungeons of Daggorath*, how do you kill the wizard's image?

Fallon Yager
Bellevue, ID

Scoreboard:

What do I do after you have the golden chopstick in *Raaku-Tu*? How can I open the wooden door that says "do not enter"? What use is the secret tunnel?

In *Dungeons of Daggorath*, what is the use of the Abye flask? When is the best time to use the Hale flask?

In *Pyramid*, how can I keep the mummy from taking my treasures? How do you open the sarcophagus? After chasing the serpent away, is there any other use for the statue?

Steven Kaschimer
Tucson, AZ

Scoreboard:

In *Trekboer*, roman numerals will lead you to an unusual planet, but I cannot find the amulet that helps you get across the bridge.

In *Major Istar*, I have found the dome and have landed safely, but how do you beat the security guard droids?

Rick Kelton
Newport News, VA

Scoreboard:

In *Rogue*, when battling a lot of monsters in a room, stand in a doorway. Doing this will allow only one monster to attack you at a time.

To keep your man alive, after you save a game, cover the write protect notch on the disk. This way, when your man dies it won't erase your saved game. This also prevents your man from being permanently entered into the hall of fame.

Wands and staves may ricochet. Zapping creatures diagonally may be less convenient, but is safer. Polymorphing magic is dangerous at beginning levels because the chances are greater that you will change a monster into something more powerful.

Around the fifth or sixth level, Aquadors start appearing. If you see one, remove your armor. These creatures do no physical damage; they just rust your armor. If you save all your enchant armor scrolls, use them on the first leather armor you find — leather can't rust.

Where are the dates in *Sands of Egypt*?

Brent Dingle
Norwalk, IA

Scoreboard:

You can shoot the wildcat with the rifle in *Ruby Chalice*. Typing `DOWN HOLE` in the first room of *Dr. Avaloe* will send you to the monster room.

How do you move the slab in *Ruby Chalice*? How do you get out of the dark in *Hitchhikers Guide to the Galaxy*, and how do you cross the rug in *Raaku-Tu*?

Chris Casey
Vernon, MI

Scoreboard:

In the *Interbank Incident*, if you want to get on the train at Paris just past the Louvre, simply type `GO` and point to the door of the train. To get on the next train to Germany, you need the orange European train pass. It can be found anywhere in Paris. Remember to search the flower pots.

The locker at the Seattle terminal will open as soon as you put in the quarter. Now search the locker. If nothing happens after your search, the locker is empty. If something is in the locker, you should see the message, "Look, you found something!"

The rope is used later to tie someone up and the pass is used to ride the train or ferry boat in Seattle.

Randy Cassel
Middletown, PA

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Jody Doyle

Modification 32K ECB

CoCoDraw Update

By John G. Williams

Congratulations to Darin Herr for the fine work he did on the *CoCoDraw* program ("CoCoDraw Concoctions," Page 58) published in the October 1986 issue. It is a very well-written program with excellent documentation. In fact, it would not have been possible for me to modify the program without the line descriptions he provided. The only part of the program that gave me any trouble was the switching back and forth from joystick to arrow keys for precise pointer positioning. I just could not seem to master that procedure with any speed or accuracy at all.

One way around the pointer positioning problem is to use the joystick command as "change of position" command rather than position command itself. That is, the joystick position tells the pointer how many pixels to move during each blinking cycle of the pointer. Both vertical and horizontal positioning of the pointer can be controlled in this manner. A stick movement of one unit could result in a pointer movement of one pixel and so on.

The problem with this simple relationship is that the extreme sensitivity the pointer exhibits is no improvement at all over the original method. What is needed here is a non-linear stick command so that near-center movement of the stick results in very slow pointer movement, yet rapid pointer motion can be obtained when needed.

John Williams is an aircraft industry structural engineer. He lives in Azle, Texas, and enjoys his CoCo very much. His son, a Texas A&M engineering major, is also a CoCo fan.

This method may be familiar to some, as it was the subject of a short article in the August 1985 issue ("The Joystick Fix It," Page 226). In that article I demonstrate how the stick command could be tailored to any requirement with a non-linear equation. Such an equation could be solved repeatedly for new pointer location and would suit our *CoCoDraw* problem exactly. However, we already know about that method, so why not learn yet another way to use stick commands for our purposes?

Since the joystick has only 64 possible positions in each axis, an equation relating stick command to pointer motion could have only 64 answers for each axis. Rather than solving the equation over and over for only 64 possible pointer motion commands, why not solve the equation once for each stick position and save the results in a table? We can then look up these results in the table and move the pointer as slowly or quickly as desired. In fact, this procedure is known as the "table-look-up" method and is much faster than having to solve the non-linear equation repeatedly.

The table is a one-dimensional array of values I call `DP(J)`, where `J` is the subscript of `DP` and ranges from zero to 63, which is of course the range of our joystick command. If you need to review arrays and subscripts, see your BASIC manual for more information.

The name `DP` stands for "delta pointer," since the Greek letter delta is frequently used to represent change in a variable.

To generate the table of stick commands, insert Line 11 into the *CoCoDraw* program:

```
11 DIM DP(63):FORJ=0TO63:N=J
   -31:DP(J)=INT(.5+(ABS(N)*
   N/50):NEXT
```

This line provides space for the array with `DIM DP(63)`, calculates all 64 values of `DP(J)` and stores them in the array. Of course other equations could be derived which would do just as well. For example, the sensitivity of the pointer can be adjusted by changing the divisor. Larger values such as 70 or 80 give slower movement, while smaller values give faster movement.

If you are interested, it would be easy to list out the values of `DP(J)`, just to see what the array looks like. Another possibility is to put the values of `DP(J)` in `DATA` statements and use a `READ` statement to store the values.

The lines in the original program that read joystick and arrow key commands are 9400 through 9540. Those lines must be deleted and the following new lines must be added which read the stick and calculate the new pointer position.

```
9400 X=X+DP(JOYSTK(0)):Y=Y+
     DP(JOYSTK(1)):FB=PEEK(&
     HFF00)OR&H80
9410 IFX<0THENX=0ELSEIFX>255
     THENX=255
9420 IFY<0THENY=0ELSEIFY>191
     THENY=191ELSERETURN
```

The new position (X or Y) is the old position plus the delta position (DP) commanded by the joystick. Note the joystick command is the subscript of the array DP. In this manner the stick position is directly related to the previously calculated table of DP(J) values, and the stick merely tells which value of DP to add to the old pointer position.

The range checks in lines 9410 and 9420 are added to prevent crashes resulting from trying to plot off the screen.

Two other minor changes are necessary to make the pointer behave properly with these new commands. The following statement must be inserted in Line 6280 just before the GOTO 6280 at the end of the line:

```
X=XX:Y=YY:
```

Line 5630 must be modified by inserting the following statement between ELSE and 5600 near the end of the line:

```
X=XX:Y=YY:GOTO
```

These modifications result in better control of the pointer. It is now very easy to move one pixel at a time for precise control, yet it can be moved rapidly when you want to get to a distant part of the screen. The motion is different since the pointer does not follow the position of the stick but moves in the direction the stick points, at a velocity related to stick displacement. After just a few minutes of practice, it feels natural.

One other difference in the program now is how the Ray function works. To use Ray, move the pointer to the center point as before and click the button (do not hold it down). Move the ray to where you want it and click again. So far, no difference; but now if you want another ray, click the button again and move the new ray to the desired point. Repeat as desired. When you don't want another ray from that origin, just hold the button down until it beeps and continue with another set of rays or select another option.

I hope you find this modification useful. It has made an already fine program just a little easier to use. *CoCoDraw* now has the ability to easily put the pointer on any pixel without an expensive analog-to-digital converter like *CoCo Max* uses. I have tried it with both the standard and deluxe joysticks, but not with a mouse. The deluxe stick is much better because of self-centering, and I would encourage everyone to use one if possible. With the standard stick you will probably want to slow the motion down as described earlier.

Keep in mind that there are ways to use joysticks other than what is shown in the manuals, and that this array/subscript procedure has other applications limited only by your imagination. Our CoCo is a marvelous machine and is capable of doing far more than most of us ever ask it to do, as are our own brains.

Again, thanks to Mr. Herr for a very nice job of programming and documentation. If anyone has comments or questions about the modification, write me at Rt. 2, Box 285, Azle, TX 76020. Please remember to enclose an SASE when requesting a reply. □

Editor's Note: The complete CoCoDraw *system consisting of two programs,* MENUGEN *and* COCODRAW, *will appear on RAINBOW ON TAPE and RAINBOW ON DISK this month. The modifications detailed in this article will have already been made. Refer to your October 1986 issue of RAINBOW for specific instructions regarding how to use* CoCoDraw. *Page 168 contains information on ordering back issues.*

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A Conversation With the CoCo SIG Manager

By Cray Augsburg
Rainbow Technical Editor

Over the past several months, many readers and Delphi users have asked why RAINBOW doesn't publish some of the excellent programs that have been uploaded to Delphi. To gain some insight into this matter, I discussed the subject with Jim Reed (JIMREED), who is both the CoCo SIG Manager on Delphi and the Executive Editor here at Falsoft.

Cray: What is the basic reason THE RAINBOW doesn't publish material that has been uploaded to Delphi?

Jim: Certainly, there is a great deal of very good Color Computer material on Delphi, Cray. But, we must keep in mind the availability of this same material from many sources, such as CompuServe and local bulletin boards. I can see someone saying, "How dare you print and charge money for a magazine with public domain listings I can get lots of other places!" We like to think of our Delphi service as an extension of THE RAINBOW. I don't see it as an either/or situation.

Cray: Is all of the material in the CoCo SIG public domain?

Jim: No! *Most* of the material on the SIG is *not* public domain. The great majority of the items are copyrighted. A lot of people do not understand this. We can't, for instance, just grab *Mikey-Term, Greg-E-Term* or *Rickyterm* and print them in the magazine; they are all copyrighted!

Cray: But, what about all of the programs that are, in fact, in the public domain? Many of our readers don't have modems.

Jim: Yes, there are a lot of clearly designated public domain programs in the databases, and, yes, many RAINBOW readers cannot just jump online and download them easily. But, please keep in mind that Delphi is a for-profit business. It does not make good business sense for Delphi to lose revenue by allowing the best stuff to be published in a magazine.

Additionally, even if we were to "commandeer" some of the best public domain programs, in order to print them, we would have to give up space

---

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

This month was a busy one on the RAINBOW SIGs! Uploading activity was brisk in spite of the summer heat as users were busy drawing and digitizing pictures for others to enjoy. The Graphics topic of the database is the largest by far of all the topic areas, occupying about 40 percent of the entire database. If you're interested in graphics, (especially *Color Max 3* graphics) then the RAINBOW CoCo SIG on Delphi is the place to be!

OS-9 Online

In the Graphics topic area, **Dave Archer** (DAVEARCHER) contributed `FAT.FNT`, a "fat" IBM font converted from the RS-DOS font of the same name that Marty Goodman uploaded to the CoCo Sig. **Jerry Greiner** (JERRYCG) gave us a graphics editor with documentation and a sample start-up window. **Jason Forbes** (COCO3KID) contributed 33 Level II fonts in an `ARed` file for use with graphics windows. Jason also included a documentation file giving full information on how to load and display the fonts on Level II windows.

In the Users Group topic area, OS-9 Online SIGop **Greg Law** (GREGL) enabled seven more of the Users Group files: `CAL`, `CCGOTOXY`, `CHANGE PASSWORD`, `CHANGE TERM`, `CHAR TO INT TO CHAR`, `CHECK` and `CHECKBOOK`.

In the Utilities topic area, **George Janssen** (GBJANSSEN) contributed an updated version of his fine *PAK* utility. *PAK* compresses several files into a single file, which is called an "archive" file. Such archived files take up a minimal amount of space. Another good use for *PAK* is storing all pieces of a system into one archive and eliminating excessive directory entries.

George also provided `FILEX.PAK`, a utility for a recursive directory listing showing name, date last modified and size of the file. The listing may be in name, date or size sequence, in either ascending or descending order. `FILEX` also has a Find option that will search for all filenames beginning or ending with *xxxx*, such as all files ending in `.c` or all files beginning with `test`.

Steve Bjork (6809ER) submitted his program *Setype*, which allows a user to in the magazine used for original material we purchase from our readers — programs that are *not available anywhere else*. As it stands now, you get a variety of material, both in the magazine and on Delphi.

Cray: Couldn't RAINBOW alternatively add a couple of public domain programs on RAINBOW ON TAPE and RAINBOW ON DISK each month to help those who cannot access Delphi?

Jim: That would be a problem, too. As you know, there is often little room left on the tape and disk when we finish saving all the programs appearing in the magazine. Sometimes we even have to use both sides of RAINBOW ON TAPE, rather than have one side as a backup, just to hold all the material.

More important, we already have problems with readers being unable to use RAINBOW ON TAPE programs, simply because they have not bought — or bothered to read — the magazine article corresponding to the program. I hate to think of the situation we would create if we decided to "throw in" some extra, totally undocumented programs.

Finally, keep in mind that we do copyright the tape and disk products, as well as the magazine. Therefore, we would be in the position of copyrighting a product that clearly had some public domain programs on it! Now, there is actually nothing wrong with that — for instance, a copyrighted history textbook has lots of public domain material in it — but I think it would serve to "muddy the water" as to whether RAINBOW ON TAPE/DISK is indeed a copyrighted product.

Cray: Then, there are no plans to somehow publish some of the Delphi material in THE RAINBOW?

Jim: In spite of my foregoing concerns, we do discuss such possibilities as finding some avenue to deliver to our RAINBOW readers material that is available on Delphi, but inaccessible to those without modems, local nodes, etc. But, the key thing is that we cannot ruin the market for Delphi by "skimming off the cream." Delphi is providing a needed service and deserves a return on its investment, too. Remember, Delphi usually provides free upload time as an incentive, and it pays people to organize the databases, to publicize the existence of these CoCo programs and to help members with these programs. Plus, Delphi keeps it all stored on disk. All of this constitutes an investment that should provide a reasonable return.

Cray: What would you recommend to those who do not have access to Delphi?

Jim: I'd point out that I've seen brand new modems for as little as $15. There's a whole new world to explore with your CoCo when you reach out through the telephone lines. It's mighty handy to be able to post a gnawing technical question on the CoCo SIG — even in the middle of the night — and have it answered in a matter of hours, sometimes minutes. I'd also point out that Christmas is coming!

Online Shopping

Jim Reed invites all SIG members to visit the Shopping area in the CoCo SIG. Recently, the Shopping area underwent active development, and several advertisers have already started selling their products online. Along with all Falsoft products, you can order items from such advertisers as Computer Plus, Gimmesoft, Speech Systems and Spectrum Projects.

To get to the Shopping area, just enter `SHOP` from the CoCo SIG or OS-9 Online SIG prompt. Once there, you can browse the area for vendors or products. If it is your first time in the Shopping area, you will first need to set up a method of payment. Then, when you order a product, the process will be much quicker and easier. □

set the joystick type (low or high resolution) and monitor type using an option list or a menu for selection. It's very handy for autoboot programs and may be added to the start-up file. **Bert Challenor** (BERTAC) sent us the source code to his spooler program, which allows up to five files to be spooled.

In the Patches topic, **Kevin Darling** (KDARLING) submitted an interesting text file describing the known bugs, fixes and patches for CoCo 3 OS-9 Level II Version 2.00.01.

CoCo SIG

In the General topic area, **Brian Wright** (POLTERGEIST) sent us some interesting jokes from his collection and a text file clarifying his first grouping of files about the FCC proposal for Value Added Networks. Brian has also published a copy of the entire FCC docket, as well as some counterproposals and arguments. **Rick Adams** (RICKADAMS) provided a list of Tandy's top 10 games for the CoCo. **Kevin Nickols** (NICKOLS) provided us with the Tandy Newsletter for July. (Kevin is the SIG manager for the Tandy and PC Compatibles SIGs.)

In the Source Code topic area, **Roger Krupski** (HARDWAREHACK) posted the source code for the newest version of his popular Morse Code generator program, and an enhanced Screen command for CoCo 3s that allows the user to set up a 40- or 80-column screen without complicated `PALETTE` and `WIDTH` commands. I posted the source code for a short line feed stripper utility, and a similar utility that converts all-uppercase text files into all-lowercase. I use these utilities sometimes to clean up documentation files on the SIG, making them a bit more readable. I also posted the source code to the `BASFIX` utility I submitted in the Utilities topic.

In the Utilities topic area, Roger Krupski favored us with an updated version of his Morse Code generator program. **Glen Hathaway** (HATHAWAY) posted an experimental version of his *SNAP* disk editor for the CoCo 3. Several SIG members downloaded the program and made suggestions for improvement, which he has promised to include in the final version.

Roger Bouchard (HARBIE) posted an ML utility to add the `SaveS` and `LoadS` commands to ADOS-3 users, just as Steve Bjork's `DFIX` utility provided for the users of Disk BASIC. **Kenneth Wuelzer** (WUELZERKEN) posted Version 2.5 of his very popular *KDSK* disk editor. *KDSK* can examine/modify any sector on a disk in either R/S, OS-9, FLEX, or MS-DOS formats. It has provisions for fast copies, backups, formatting, sorting and cataloging disks, printing labels and other features.

Jason Forbes posted a program for astronomy buffs called `POSITION.BAS`, written by Jeff Yoder. Give the program a date and a planet and it will return the correct ascension and declination relative to the Celestial Plain. I also posted my line feed/null remover programs as well as the previously described uppercase to lowercase utilities. These files were posted in response to a user's request in Forum.

Additionally, I posted a program called *BASFIX*, which I hope will eliminate several problems for cassette users. BASIC programs saved on disk contain control information which is not present in BASIC programs on cassette, making files on disk incompatible with cassette systems unless that control information is removed. *BASFIX* is a machine language utility that reads a compressed BASIC cassette file that originated on a disk system and removes the control information. This will make the RAIN-

BOW ON TAPE files in the database accessible to tape users.

In the Hardware topic, **Bob Mahoney** (COCO3) sent us a complete listing of the RS-232 connector for the RS-232 pack. This file includes information that is not found in Tandy's otherwise excellent documentation. **Marty Goodman** (MARTYGOODMAN) continued providing us with his informative, hardware-related articles. This month, Marty contributed an article describing how to repair a damaged disk controller. This file originated as the result of several Forum questions from SIG members.

Marty also provided us with an interesting technique for breaking out of protected games and programs in his file called "SHIFT-BREAK-Reset Trick Revealed." Using this technique, you may examine and modify your game programs to get more lives, or you may choose to modify your utilities according to your own needs. This technique will usually work with programs that autostart, and is usually effective even with the ones that normally require one to power-down to exit the game.

Marty then provided us with a description of how to get a composite color signal from a CoCo 2. This file contains information that is peculiar to the CoCo 2 and resulted from a member's question in the Forum. Marty is available frequently in the Forum to assist you with your hardware problems. The more interesting ones may also be published in Marty's "CoCo Consultations" column in RAINBOW Magazine.

In the Games topic, Rick Adams and **Mike Ward** (MIKEWARD) teamed up to provide patches for the *Dungeons of Daggorath* game to allow it to run on the CoCo 3, as well as to provide some enhancements. Brian Wright posted a bowling game, and **Jim Pogue** (JIMPOGUE) posted a revised and greatly enhanced version of his very popular *Scrabble* game. **James McDaniel** (NEWKID) contributed an excellent game called *Crescue*. This game features several high resolution screens and very interesting action.

In the Graphics topic area, **Bob Wharton** (BOBWHARTON) posted a total of 18 MGE files! This makes Bob this month's most prolific contributor. Bob posted 10 nudes converted from ST pictures and several other original and converted pictures. I posted a couple of digitized pictures of possible candidates for CoCo Cat at the Princeton RAINBOWfest. (Others are invited to post their candidates/dreams also.) I also posted four new "fantasy" style pictures that are converted ST pictures. These are all quite detailed and unusual. **Mike Andrews** (MANDREWS) posted his patch to Erik Gavriluk's *Macverter* program. Mike's program converts Erik's program to print on a Tandy DMP-105 printer instead of an Epson printer, and may work with other Tandy printers, as well.

Jason Forbes posted two MGE pictures of the starship *Enterprise* from the movie *Star Trek* and an outstanding converted ST picture of a springboard high diver. **Eric Robichaud** (EGROBICHAUD) contributed a very colorful MGE picture of everybody's hero, Bugs Bunny. The quality of this picture is truly outstanding. Rick Adams contributed a BASIC program that changes the palette positions of selected colors in an MGE format picture. It does not change the actual colors, just the palette positions. This is useful for pictures whose colors in palette positions 0 and 15 are so similar (or identical) that it is next to impossible to use *Color Max 3* to view or edit them.

D.K. Lee (HORNETI) posted four new original pictures he drew using *Color Max 3*. Roger Bouchard posted *Mandril Mania*, two pictures of the gorilla that you've seen on the Amiga, the ST, the Apple II GS and the IBM. Now you can see that gorilla face to face on your CoCo 3. **James Farmer** (MODEMMASTER) sent us a digitized picture of Charles D. Tandy in MGE format. Tandy buffs will want this one for sure.

Clay Kunz (ZAFODBEBLBRX) contributed an interesting raindrop "splash" program that draws concentric circles spreading out from the center of the screen. **Billy Hambric** (SNOOPYDOG) gave us an interesting *Peanuts* MGE picture of Lucy holding the football for Charlie Brown. Just in time for the Fourth of July, he also sent us an MGE picture of Snoopy waving the flag and shooting fireworks, plus a digitized, 16-level picture of Snoopy and Alf done with the DS-69 digitizer.

In the Music topic area, **Randy Cassel** (BBTROLL) sent us his rendition of "Jingle Bells" as done on the *CoCo Composer*, which was published in the December 1983 RAINBOW. **John Brennan** (FIREFLY) sent us three of his favorite classic folk rock songs, which he arranged using the *Bells and Whistles* program from RAINBOW. **Bryan Eggers** (SOFTAFFAIR) provided us with 17 new music files for *Orchestra-90*. All *Orchestra-90* fans should check these out because Bryan sent us some of the best of his collection.

In the Data Communications topic area, **Bill Tucker** (BILLTUCKER) sent us a listing of governmental BBSs that may be accessed by the public. **Mike Fischer** (MIKE88) sent us Version 2.2 of *Phone Clone*, a disk transfer utility.

We hope to see all of you on the RAINBOW CoCo SIG on Delphi!

— Don Hutchison
RAINBOW CoCo SIG Database Manager

Two-Liner Contest Winner . . .

This little graphics quickie will surely excite some of you sci-fi fans out there.

The listing:

```
0 PMODE3,1:SCREEN1,0:COLOR2,3:PC
LS:CIRCLE(128,34),50,,1/3,0,.5:C
IRCLE(128,50),75,,1/3:COLOR4,3:C
IRCLE(128,170),5:LINE(123,178)-(
128,173),PSET:LINE-(135,178),PSE
T:LINE(128,173)-(128,181),PSET:L
INE-(123,186),PSET:LINE(128,181)
-(135,186),PSET
1 CIRCLE(115,45),5:CIRCLE(142,45
),5:FORX=1TO1500:NEXTX:COLOR1,3:
FORY=75TO190:LINE(120,Y)-(136,Y)
,PSET:NEXTY:FORX=1TO500:NEXTX:CO
LOR3,3:FORY=190TO75STEP-1:LINE(1
20,Y)-(136,Y),PSET:NEXTY:FORX=1T
O200:NEXTX:COLOR4,3:CIRCLE(128,4
5),5:FORZ=0TO1STEP0:NEXTZ
```

Mark Rucinski
Oshkosh, WI

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

Computer/Baud Rate Destruction

By Marty Goodman
Rainbow Contributing Editor

I have the old Color Scripsit *ROM pack. When I type* `POKE 150,18` *to set the CoCo to 2400 baud (which I like to use for my DMP-130), and then plug in the* Color Scripsit *ROM pack, the* `POKE` *does not "take." That is, the baud rate is still 600 under* Color Scripsit. *How can I make that* `POKE` *stick? Also, I have found my CoCo 2 contains 88 in location 150, not the 87 I read was supposed to be there. Why is this?*

Michael R. Wetzstein
Tifton, GA

Never ever plug in a ROM pack cartridge with your computer turned on! This will result in the destruction of the computer. If you read the literature Tandy supplies with the computer and the ROM pack, you would have been warned against this most dangerous practice.

The old *Color Scripsit* ROM pack uses its own internal program code to operate the RS-232 port on the CoCo, and this code is fixed at 600 baud. There is little you can do about that. I recommend you switch to a better word processor. *Telewriter 64* is available as a tape program. It has provisions for baud rates from 300 to 9600 in addition to supporting 51-, 64- and 85-column displays, plus many other things not found in *Color Scripsit*.

Microsoft changed the official baud rate constant for 600 baud from 87 to 88. Thus, later model CoCo 2s have 88 in the baud rate delay constant location 150, not the 87 that is usually referred to in older Color Computer literature.

Saving PMODEs

How do I save `PMODE 4` *graphics screens to tape or disk?*

John Smith, Jr.
St. Peter, FL

If you have a tape system, the command `CSAVEM "filename", &H600, &H1DFF, &HA027` will save the screen to tape. With a disk system, the way to save such a screen would be `SAVEM "filename.ext", &HE00, &H25FF, &HA027`. Just substitute your file in place of *filename*. The first two numbers in those commands are the addresses in memory of the CoCo's first four graphics pages. The last number in each command (`&HA027`) is the address of the reset routine in the CoCo, and is used as a safety factor, just in case you accidentally mistake those graphics files for a machine language program and try to execute it. If you have a graphics screen saved to tape and want to load it into the graphics area on a disk system, merely load it using the command `CLOADM "filename", &H800`. This will "offset load" the tape system graphics screen into the area that is correct for a disk system.

Converting Speech to Sound

What is the address of the analog-to-digital converter in the CoCo? I want to use the joystick line to convert speech to digitized sound.

Brian Kschak
Reigelsville, PA

The analog-to-digital conversion hardware in the CoCo is *not* accessible via a simple address. It is largely software driven: You must, using assembly language, operate the digital-to-analog converter a multiple of times and compare the values to what is seen by the analog-to-digital port, adjusting the value up or down depending on whether the value you have was reported as higher or lower than what was on the analog lines. Naturally, this must be done quite rapidly, in assembly language, to be at all useful. The routine in the BASIC ROM located at the address contained in locations $A00A and $A00B does this. You might want to study that routine, even though the one given in BASIC is rather slow. The best means of digitizing voice on the CoCo is to use Delta modulation. Delta modulation is far more memory-efficient than digitizing the amplitude of the wave form. With Delta modulation you merely use a single bit per sample of the sound to record whether a "guess" at the amplitude of the wave form was higher or lower than the actual wave form. Thus, you can pack eight times as many samples into memory, and digitization of the sound proceeds far faster, too. This approach "chases" the wave form as it rises and falls.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

Dead Keys

My CoCo 3's keyboard is malfunctioning. Two rows of characters in the wiring matrix no longer work. I have substituted a second keyboard, but the problem remains, and the original keyboard works fine on another CoCo. I have also replaced the 74LS30 chip on the CoCo 3, but this has not cured the problem. Can you help?

Bill Jackson
(BILLJACKSON)
Sacramento, CA

Keyboard problems of the sort you describe (a row or column of dead keys) are often caused by a break in the wires on the keyboard mylar cable and are very hard to fix without replacing the keyboard. In your case, however, you have proven that this is not the problem. Another cause of a row or column going out is a damaged PIA chip. On the CoCo 3, IC 5 (LSC81001) is the keyboard PIA chip. You will have to desolder this 40-pin chip, socket it and obtain a replacement chip from Tandy. Fortunately, the replacement chip is relatively inexpensive and available from National Parts. I recommend you "destructively" remove the old chip, cutting each pin off it, desoldering the pins and removing them using long-nosed pliers, then cleaning up the holes with a solder slurper prior to placing a socket there and soldering it in. Of course, you will first have to remove the CoCo 3 motherboard and remove its ground plane metal sheet. The 74LS30 chip is involved in generating the keyboard interrupt and could not cause the type of problem (one or more rows or columns dead) you describe. The only other thing to check before replacing your PIA is to make sure all lines from the keyboard connector on the CoCo 3 are intact on their way to the pins of the keyboard PIA.

Cheap Communications

What communications program do you recommend for a 64K CoCo 2 that costs under $25?

John Freidrich
Natrona Heights, PA

I am in full agreement with Dr. ASCII (see Page 127 of the August 1987 RAINBOW) that your two best bets are *Mikeyterm* and *GEterm*. Each is available for $10 from their authors (Mike Ward, 1807 Cortez, Coral Gables, FL 33134, and Greg Miller, 9575 Royston Road, Grand Ledge, MI 48837). I recommend you buy both, for both are excellent, and the total cost will be under $25.

Malfunctioning Joysticks

I have connected a Sony KV1311CR monitor/TV to my CoCo 3 using a cable like the one you described in the August RAINBOW. It "steals" 5 volts from the joystick port to run its sync combiner chip. But now my joysticks do not function. Full movement of the joystick no longer fully affects the value seen by the computer. Can you help me?

Herbert F. Farmer
Ipswitch, MA

The problem is caused by a current-limiting resistor in the joystick port circuit. The cure is quite simple: Merely open your CoCo 3 and short out the resistor labeled R13. This resistor is 100 ohm (color code brown, black brown) ½ watt (slightly fatter than most other resistors on the CoCo 3), that can be found to the right of the rear-most of the four 4464 18 pin DRAM chips on the CoCo 3, near the rear of the computer. The Sony KV1311CR to CoCo 3 RGB cables currently being sold by Spectrosystems and by Spectrum Projects now have two extra pages of instructions added to explain this and give several alternative approaches to curing this problem.

Remote Keyboard

I read your article giving tips on how to make a remote keyboard cable for the CoCo. Could you please list the components needed and provide me with step-by-step directions for making one?

Mike Duvall
Zanesville, OH

Without the use of special adapter boards, making a keyboard extender cable is a job for an experienced hacker, and it is not easy to provide step-by-step instructions. But because I had so many requests like yours for more specific instructions on making such a cable, I engineered a keyboard extender cable that is now available to the public (see Spectrum Projects ad). This cable still requires some ingenuity to fully and properly install, but much of the hard part of keyboard cable construction (especially the connection between cable and CoCo and cable and keyboard) is done for you. You still have to supply your own case for the remote keyboard.

Drive Alignment

I've had problems with the drives on my CoCo 2. Finding a place that would do alignment on them was difficult, and the work was expensive. After the drive was repaired, our CoCo 2 behaved as if it had only 32K. Why? We plan to get an NEC monitor but are not sure how to hook it up.

Thomas Crowe
Villavicencio, Colombia

J&M systems sells *Memory Minder.* This package, which costs about $90, is a superb disk drive alignment system. With it, those who are familiar with the basics of how floppy drives work and how they are adjusted can do all common disk drive alignment tasks without use of an oscilloscope. I've tested this program extensively against the more traditional method of disk drive alignment and find it to be extremely accurate and much easier to use.

I have no idea why the upper bank of RAM on your CoCo 2 has ceased to operate. It is possible that one or another chip in your CoCo 2 has been damaged.

There are many vendors that advertise in RAINBOW (Moreton Bay, Howard Medical, Computerware, and others) that sell adapters needed to hook a monitor to a CoCo 2. It is important that you specify whether the monitor is a color or a monochrome monitor and what kind of monitor it is. The CoCo 2 can be easily made to work with composite color and composite monochrome monitors. It cannot be adapted to RGB monitors, nor can it be adapted to IBM type TTL monochrome monitors.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

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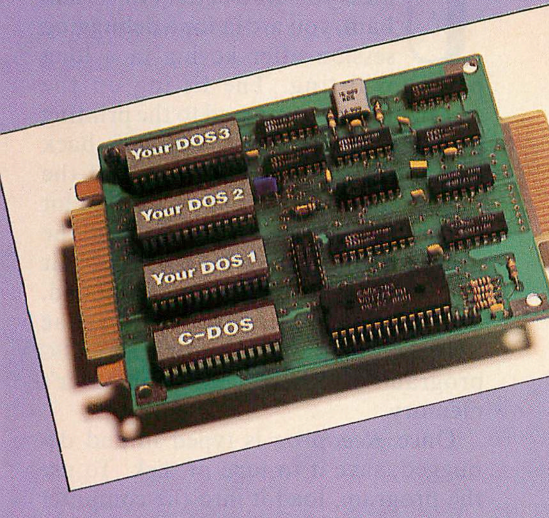

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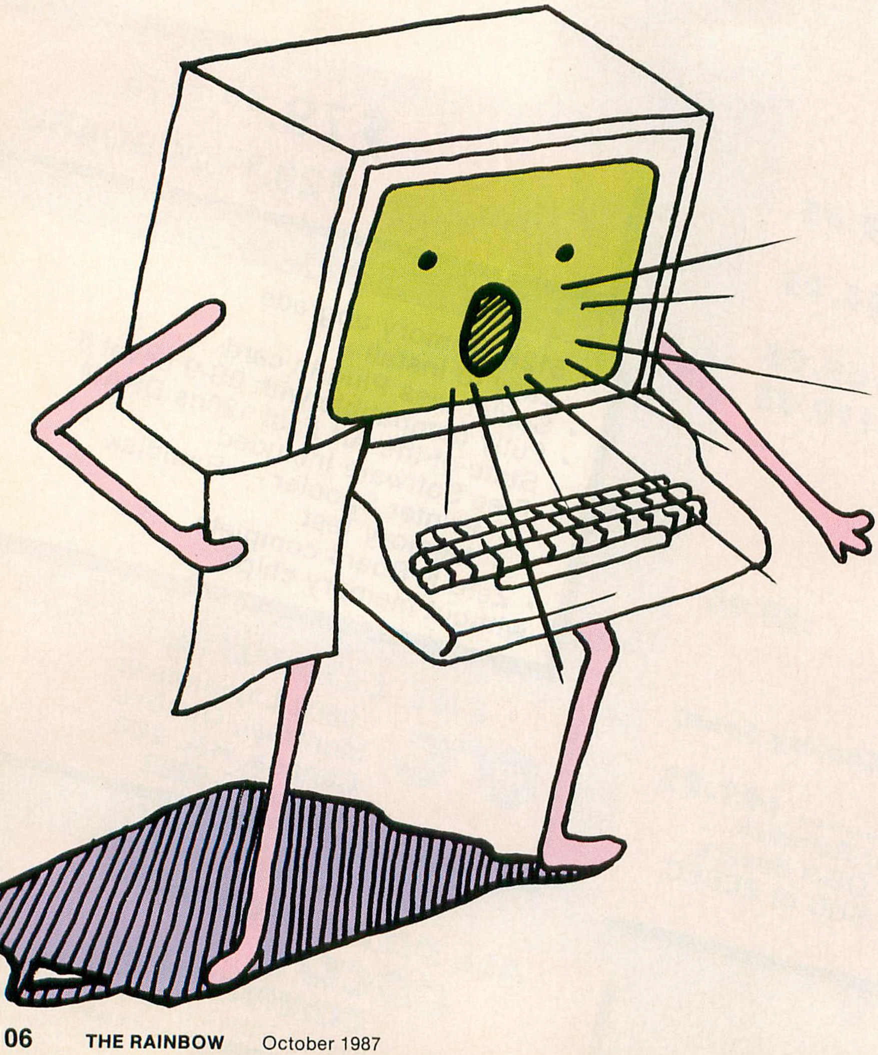
Yakety-Yak

the CoCo Talks Back

By Bob Roberts



Unless you are a better typist than I am, you are in for a debugging session after keying in a long program listing. The listing on the screen must be compared to the printing on the page. Your eyes will shift back and forth between the screen and the magazine many times. It would be a lot easier to have the computer read the program while you sit in your easy chair and follow along until an error is found. The program *Readprog* uses the Speech/Sound Cartridge to read BASIC programs residing in the computer's memory.

Once *Readprog* is typed in and debugged, save it to tape or disk. To use the program, load it into the computer before beginning work on a new listing. *Readprog*'s line numbers begin at 60000 to avoid conflict with the program being entered. If you have a disk system, you can merge *Readprog* after you've finished typing. Remember that in order to use the `MERGE` command, *Readprog* must first be saved in ASCII format (i.e., `SAVE "READPROG", A`).

To get *Readprog* started, type `RUN 60000`. A menu will appear with the option to begin reading at the start of the program, start reading at a specified line number or read only line numbers.

The option of reading only line numbers was included as a quick check for one of my favorite errors, leaving out a line.

The program is most useful for reading long, number-packed code, such as `DATA` statements containing machine language instructions or `DRAW` strings. So, I built in the ability to skip the mundane stuff and get directly to the area of the program that is causing the problem.

Bob Roberts is an industrial engineer for Anchor Hocking Corporation in Lancaster, Ohio. He is married and has two daughters who are more interested in boys than computers, a cat (also non CoCo) and a cocker spaniel.

If you select any option but reading the line numbers, you will have two more choices to make. The program will ask if you want to pronounce the word "space" each time a blank is encountered. With a few exceptions, spaces do not affect the proper functioning of BASIC programs, so I usually elect not to have blanks spoken. The next choice is whether or not to read all of the material following a `REM` statement or apostrophe. Again, remarks do not affect the operation of the program, and a lot of time can be spent listening to program notes or to the computer saying "asterisk" 32 times. If you opt not to hear the remarks, the program will say the line number and then say "skipping" to indicate the omission.

The BASIC keywords are pronounced as they might be spoken instead of being read literally. For example, `RND` is read as "random;" `CLS` is read as "clear the screen" instead of simply C-L-S. If you don't like my versions of the pronunciation, you can substitute your own. The `DATA` statements contain strings for saying and printing the keywords.

If the pronunciation of a word is different from the way the word will be printed, the string consists of the part to be pronounced to the left of an up arrow and the printed part to the right of the arrow. Words sounding the same as they are printed, e.g., `LIST`, do not have an arrow.

Integer numbers less than 10,000 are also spoken as they are usually pronounced. Line number 943 will be read as "nine hundred forty-three" instead of "nine four three."

The computer will print the words on the screen as it says them. To pause, press any key. Press any key again to continue.

Readprog will run on CoCo 2s and 3s, and it will read Color BASIC, Extended BASIC, Disk BASIC and CoCo 3 keywords.

Start up *Readprog* and follow along as it reads, noting any changes you will need to make to the program. Enter all changes in one editing session, and you should be in business. When you are finished, don't forget to delete *Readprog* by typing `DEL 60000-` before saving your new program.

By the way, if anyone knows how to make the Speech/Sound Cartridge sound like a female Klingon, I'm dying to hear from you. I hope you find the program useful.

(Questions regarding this program may be directed to the author at 3180 Meadowbrook Drive, Lancaster, OH 43130. Please enclose an SASE when requesting a reply.) ☐

60120	14	60640	164
60220	69	60700	237
60340	25	60840	171
60390	92	END	108
60590	202		

The listing: `READPROG`

```
60000 '************************
60010 ' BASIC PROGRAM READER
60020 '        (READPROG)
60030 'REQUIRES RS SPEECH/SOUND
            CARTRIDGE
60040 '
60050 '    BY BOB ROBERTS
60060 ' COPYRIGHT (C) 1987
60070 '************************
60080 CLEAR2000:DIM T$(120),U$(4
5),TE$(18):QF=1
60090 CLS:PRINTTAB(9)"PROGRAM RE
ADER":PRINT@128,"1. READ FROM ST
ART OF PROGRAM.":PRINT:PRINT"2.
START READING AT A SPECIFIED
LINE NUMBER.":PRINT:PRINT"3. REA
D LINE NUMBERS ONLY.":PRINT@448,
"ENTER YOUR CHOICE :";
60100 A$=INKEY$:IFA$="" THEN6010
0 ELSEA=VAL(A$):IFA<1 OR A>3 THE
NSOUND100,1:GOTO60090 ELSEIFA=2T
HENCLS:PRINT@224,"";:INPUT"KEY I
N LINE NUMBER TO START AT  THEN
 PRESS <ENTER> ";A$:LN=VAL(A$) E
LSEIFA=3 THENLQ=1
60110 IFA=3 THENCLS:GOTO60150 EL
SECLS:PRINT@192,"DO YOU WANT THE
 COMPUTER TO SAY ";CHR$(34);"SPA
CE" ;CHR$(34);"  EACH TIME IT FI
NDS ONE OR TO IGNORE IT ?":PRINT
:PRINT"PRESS <S> TO SAY OR <I> T
O     IGNORE.";
60120 A$=INKEY$:IFA$="" THEN6012
0 ELSEIFA$="S" THENSF=1 ELSEIFA$
<>"I" THENSOUND100,1:GOTO60120
60130 CLS:PRINT@224,"DO YOU WANT
 THE COMPUTER TO READREMARKS (Y/
N)?";
60140 A$=INKEY$:IFA$="" THEN6014
0 ELSECLS:IFA$="N" THENRF=1 ELSE
IFA$<>"Y" THENSOUND200,1:GOTO601
30
60150 READ I$:IF I$<>"XTOKEN" TH
EN60150
60160 READ I$:IFI$<>"ENDT$" THEN
 T$(I)=I$:I=I+1:GOTO60160
60170 I=0
60180 READ I$:IFI$<>"ENDU$" THEN
 U$(I)=I$:I=I+1:GOTO60180
60190 FORI=1 TO18:READ TE$(I):NE
XTI
60200 X=&HFF00:Y=&HFF7E:POKEX+1,
52:POKEX+3,63:POKEX+35,60:POKE&H
FF7D,1:POKE&HFF7D,0:M=256*PEEK(2
5)+PEEK(26)+2:GOTO60260
60210 P=PEEK(M):M=M+1
60220 IFP>47 AND P<58 THENA$=A$+
CHR$(P):NF=1:GOTO60210 ELSEIFNF=
1 THENNF=0:M=M-1:GOTO60750
60230 IFP=255 THEN 60420
60240 IFP>127 THEN 60400
60250 IFP<>0 THEN 60300 ELSEP=PE
EK(M):IF P=0 THENCLS2:PRINT@229,
"REACHED END OF PROGRAM";:END EL
SEPRINT:M=M+2
```

```
60260 LZ=256*PEEK(M)+PEEK(M+1):I
FLZ<LN THEN M=PEEK(M-2)*256+PEEK
(M-1)+2:GOTO60260
60270 IF LZ>=60000 THEN CLS:PRIN
T@229,"REACHED END OF PROGRAM";:
SOUND200,1:END
60280 IFLQ=0 THENA$="LINE NUM BE
R^":M=M+2 ELSE A$=RIGHT$(STR$(LZ
),LEN(STR$(LZ))-1):M=PEEK(M-2)*2
56+PEEK(M-1)+2:GOTO60760
60290 GOTO 60450
60300 IFP>64 AND P<91 THENA$=CHR
$(P):GOTO60450
60310 IF P=32ANDSF=1THENA$="SPAC
E^ "ELSEIFP=32ANDSF=0 THENA$=" ^
 "ELSEIFP=33 THENA$="EXCLAMANATI
ON POINT^!" ELSEIFP=34 THENA$="Q
UOTE^":QF=QF*-1 ELSEIFP=35 THENA
$="CARRAT^#" ELSEIFP=36 THENA$="
DOLLAR^$"
60320 IFP=37 THENA$="PER CENT^%"
 ELSEIFP=38 THENA$="AMBERSAND^&"
60330 IFP=39 THENA$="APOSTRUPHE^
'"
60340 IFP=40 THENA$="OPEN PAREN^
(" ELSEIFP=41 THENA$="CLOSE PARE
N^)" ELSEIFP=42 THENA$="ASTERIK^
*" ELSEIFP=43 THENA$="PLUS^+" EL
SEIFP=44 THENA$="KAW MAW^," ELSE
IFP=45 THENA$="MINE US^-"
60350 IFP=46 THENA$="PEER E ID^.
" ELSEIFP=47 THENA$="SLASH^/" EL
SEIFP>47 AND P<58 THENA$=CHR$(P)
+"^"+CHR$(P)  ELSEIFP=58 ANDPEEK
(M)=131 THENA$="APOSTRUPHE^'":GO
TO60950 ELSEIFP=58 ANDPEEK(M)=13
2 THEN60210 ELSEIFP=58 THENA$="C
OLE UN^:"
60360 IFP=59 THENA$="SEM E COALU
N^;" ELSEIFP=60 THENA$="LESS THE
N^<" ELSEIFP=61 THENA$="E QUALS^
=" ELSEIFP=62 THENA$="GREATER TH
AN^>" ELSEIFP=63 THENA$="QUESTIO
N MARK^?" ELSEIFP=64 THENA$="AT^
@" ELSEIFP=94 THENA$="UP.AER OW^
^"
60370 IFP=93 THENA$="RIGHT BRACK
ET^]" ELSEIFP=91 THENA$="LEFT BR
ACKET^[" ELSEIFP=92 THENA$="BACK
 SLASH^\" ELSEIFP=95 THENA$="LEF
T AER OW^ " ELSEIF P>96 ANDP<123
 THENA$=CHR$(P-32)+"^"+CHR$(P)
60380 IFA$<>"" THEN60450
60390 IFP<128 THEN60210
60400 P=P-128
60410 A$=T$(P):IFRF=1 ANDP=2THEN
60950 ELSE60450
60420 P=PEEK(M):M=M+1
60430 P=P-128
60440 A$=U$(P)
60450 Z=INSTR(A$,"^"):IFZ=0 THEN
PRINTA$; ELSEPRINTRIGHT$(A$,LEN(
A$)-Z);:A$=LEFT$(A$,Z-1)
60460 IF A$="QUOTE" THENPRINTCHR
$(34);
60470 IF LQ=1 THENPRINT
60480 FORA=1 TO LEN(A$)
60490 IF (PEEK(Y) AND 128)=0 THE
N60490
60500 POKE Y,ASC(MID$(A$,A,1))
60510 NEXTA
60520 POKE Y,13
60530 IFPEEK(Y) <>255 THEN60530
60540 IFINKEY$<>"" THENGOSUB6094
0
60550 IFA$="LINE NUM BER" THENA$
=RIGHT$(STR$(LZ),LEN(STR$(LZ))-1
):NF=1:GOTO60760 ELSEA$=""
60560 IF LQ=1 THEN60260
60570 GOTO60210
60580 DATA XTOKEN, 4 ^FOR,GOW^GO
,REMARK^REM,APOSTRUPH E^',ELSE,I
F,DATA,PRINT,ON,INPUT,END,NEXT,D
IMENSION^DIM,REED^READ,RUN,RE ST
ORE^RESTORE,RE TURN^RETURN,STOP,
POKE,CONTINUE^CONT,LIST,CLEAR
60590 DATA NEW,C LOAD^CLOAD,C SA
VE^CSAVE,OPEN,CLOSE,L.LIST^LLIST
,SET,RE SET^RESET,CLEAR SCREEN^C
LS,MOW TER^MOTOR,SOUND,AUDEO^AUD
IO,EXECUTE^EXEC,SKIP F^SKIPF,TAB
H. OPEN PAREN^TAB(,2^TO, SUB^SUB
60600 DATA THEN,NOT,STEP,OFF,PLU
S^+,MINE US^-,TYMES^*,DIVIDED BY
^/,TO THE POWER OF^^,AND,OR,GREA
TER THEN^>,E QUALS^=,LESS THEN^<
,DELETE^DEL,EDIT,TRACE ON^TRON,T
RACE OFF^TROFF,DEFINE FUNCTION^D
EFFN,LET,LINE
60610 DATA P CLEAR SCREEN^PCLS,P
 SET^PSET,P.RE SET^PRESET,SCREEN
,P CLEAR^PCLEAR,COLOR,CIRCUL^CIR
CLE,PAINT,GET,PUT,DRAW
60620 DATA P COPY^PCOPY,P MODE^P
MODE,PLAY,D LOAD^DLOAD,RE NUMBER
^RENUM,FUNCTION^FN,USING
60630 DATA DIRECTOREYE^DIR,DRIVE
,FEELD^FIELD,FILES,KILL,LOAD,L.S
ET^LSET,MERGE,RE NAME^RENAME,R.S
ET^RSET,SAVE,RIGHT,VERIFI^VERIFY
,UN LOAD^UNLOAD,DISK INITIALISE^
DSKINI,BACK UP^BACKUP,COPY,DISK
IN PUT^DSKI$,DISK OUT PUT^DSKO$
60640 DATA  QUESTION^?,WIDTH,PAL
ETTE,H.SCREEN^HSCREEN,L POKE^LPO
KE,H.CLEAR SCREEN^HCLS,H.COLOR^H
COLOR,H.PAINT^HPAINT,H.CIRCUL^HC
IRCLE,H.LINE^HLINE,H.GET^HGET,H.
```

```
PUT^HPUT
60650 DATA H.BUFF ER^HBUFF,H.PRI
NT^HPRINT,AIRER^ERR,BRAKE^BRK,LO
CATE,H.STAT US^HSTSTUS,H.SET^HSE
T,H.RE SET^HRESET,H.DRAW^HDRAW,C
.M.P.^CMP,R.G.B.^RGB,ATTRIBUTES^
ATTR
60660 DATA ENDT$
60670 'TOKENS WITH LEADING 255.
      PUT IN ARRAY U$
60680 DATA SIGN^SGN,INTUHGER^INT
,ABSOLUTE  VALUE^ABS,USER^USR,RA
NDUMB^RND,SINE^SIN,PEEK,LENGTH^L
EN,MAKE STRING^STR$,VALUE^VAL,AS
KEY^ASC,CAREAKTER^CHR$,END OF FI
LE^EOF,JOY STICK^JOYSTK,LEFT.DOL
LAR^LEFT$,RIGHT.DOLLAR^RIGHT$,MI
D.DOLLAR^MID$,POINT
60690 DATA  INKEY^INKEY$,MEMORY^
MEM,ARK TAN GENT^ATN,CO SIGN^COS
,TAN GENT^TAN,EXPONENT^EXP,FIX,L
OGRITHUM^LOG,PUHSITION^POS,SQWHE
RE ROOT^SQR,HEX DOLLAR^HEX$
60700 DATA VARIABLE POINTER^VARP
TR,IN STRING^INSTR,TIMER,P POINT
^PPOINT,STRING DOLLAR^STRING$
60710 DATA CONVERT NUMBER^CVN,FR
EE,L O C^LOC,LAST OF FILE^LOF
60720 DATA MAKE NUMBER^MKN$,AHS^
AS,333,L PEEK^LPEEK,BUTTON,H.POI
NT^HPOINT,AIRER NUMBER^ERNO,AIRE
R LINE^ERLIN
60730 DATA ENDU$
60740 DATA TEN,E LEVHEN.,TWELVE,
THIR TEEN,4 TEEN,FIF TEEN,6 TEEN
,7 TEEN,8 TEEN,9 TEEN,TWENTY,THI
R T,4 T,FIF T,6 T,7 T,8 T,9 T
60750 REM TRANSLATE NUMBERS INTO
 EXPRESSIONS
60760 L=LEN(A$):I$=A$:Z$="":IFVA
L(A$)=0 THEN60450
60770 ON L GOTO 60920,60860,6083
0,60800
60780 GOTO 60920
60790 REM 4 DIGITS
60800 Z$=LEFT$(A$,1)+" THOUSAND
"
60810 A$=RIGHT$(A$,L-1):L=L-1
60820 REM 3 DIGITS
60830 IFLEFT$(A$,1)<>"0" THENZ$=
Z$+LEFT$(A$,1)+" HUN DER ED."
60840 A$=RIGHT$(A$,L-1)
60850 REM 2 DIGITS
60860 IFA$="00" THEN60910
60870 IFLEFT$(A$,1)="0" THENZ$=Z
$+" AND "+RIGHT$(A$,1):GOTO60910
60880 IFVAL(A$)<20 THENZ$=Z$+" "
+TE$(VAL(A$)-9):GOTO60910
60890 Z$=Z$+TE$(VAL(LEFT$(A$,1))
+9)
60900 IF RIGHT$(A$,1)<>"0"THENZ$
=Z$+" "+RIGHT$(A$,1)
60910 A$=Z$+"^"+I$
60920 IFNF=1 THENNF=0:A$=A$+" "
60930 GOTO60450
60940 IF INKEY$="" THEN60940 ELS
ERETURN
60950 IFRF=0 ANDP=58 THEN60210
60960 IFRF=0 ANDP=2 THEN60450
60970 IFP=58 THEN A$="APOSTROPHI
E SKIPPING^' SKIPPING"
60980 IFP=2 THEN A$="REMARK SKIP
PING^REM SKIPPING"
60990 P=PEEK(M):IFP<>0 THENM=M+1
:GOTO60990
61000 GOTO60450
```

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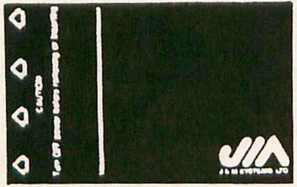

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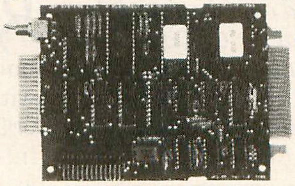

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A CoCo 3 Grab Bag

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

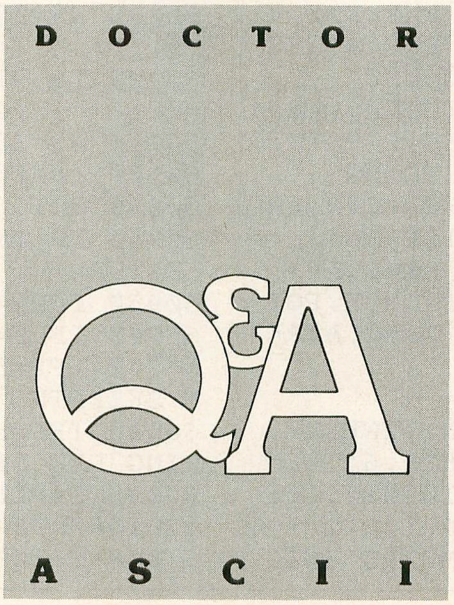
How can I make my CoCo 3 display true lowercase letters in the 32-column mode? At what speed is my computer at power-up? Is it true that my CoCo 3 is in the all-RAM mode at power-up? Also, what happened to the 160-by-192 Hi-Res screen that Tandy advertises in its catalogs?

Douglas McLaurin
Nogales, AZ

℞ You can get true lowercase and 32 columns with `POKE &H95C9,&H39: POKE&HFF22,&H34`. Your CoCo comes up at 1 MHz. `POKE 65497,0` puts it in 2 MHz mode. The CoCo 3 is in all-RAM mode after it powers up. Enhanced BASIC puts the machine in all-RAM mode, then patches CoCo 2 BASIC and adds the extensions to RAM. The 160-by-192 graphics are only available to machine language programmers.

Using BASIC09

I recently purchased OS-9 Level II, for which I waited over four months. My problem is that my CoCo will not load in BASIC09, but gives me an error — file not found. I checked the directory of the BASIC09 disk, and everything is there. The local Radio Shack can't help me. What is wrong? Also, how do you get into BASIC09?



Walter Dovawa
Bradenton, FL

℞ If you are still using the anemic 35-track, single-sided drives, after booting up replace your system disk with the BASIC09 disk and type `CHX /D0/CMDS`. Then type `BASIC09 #40K` to get into BASIC09 with maximum RAM availability.

Head Banging

I have problems with floppy disk drive head alignment. I currently use a CoCo with three disk drives, and my son runs a BBS (CoCoJet) on a CoCo 2 with four disk drives. One drive on each system will make clanking sounds during the first access after power-up or a cold start, and the heads will go out of alignment. Is there any way to correct the problems other than using another operating system or running a short program to set the heads at a low track after power-up?

Bill Sobczak
Mesa, AZ

℞ If you want a permanent fix to the head-banging problem, get an EPROM version of ADOS, which also adds some other nice features, while largely maintaining compatibility with Disk BASIC 1.0.

Composite Monitor Colors

Although what you tell Eric Crichlow in your June 1987 RAINBOW column is true, there is a way to get several hundred colors on screen at the same time with a composite color TV monitor. A program called Color 640 from Moreton Bay Software is included in A Guide to CoCo 3 BASIC and Graphics. *These are artifact colors, but they have a very nice appearance. I suggest that future commercial programs include this feature,as I will not buy any that do not.*

John Dotson
Mason City, IA

Thanks for the information.

Piggyback Upgrade

Regarding "64K Modification Revisited" June 1985, HOT CoCo; *I would like to upgrade my granddaughter's 16K CoCo 2 to 64K using*

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

2118 RAM chips in piggyback configuration. I have had no luck in locating a source for 2118 RAM Chips. Is there a different ID number I can ask for?

Bill Rosenfeld
Roslyn Heights, NY

℞ The 2118 chips are 5-volt-only, 16K-by-1 dynamic RAMs and with piggybacking can bring your machine to 32K. If you do not already have these chips on hand, you may consider a set of 4164 chips, which are 64K-by-1 dynamic RAMs, require significantly less installation effort, and cost about the same.

Lame Drives

I own a 512K CoCo 3, an RS-DOS 1.0 Disk Controller and OS-9 Level II. Since OS-9 Level II seemingly supports 80-track, double-sided drives, I recently bought a pair of Mitsubishi 80-track drives from True Data Products, who assured me that these drives were compatible with the Teac 55F. The drives did not come with any documentation, and I am not even certain what kind of drives they are. I have tried many different things, but I cannot format an 80-track disk without effectively disabling everything else. I can't make the drives double step. I attempted the procedure outlined in your June 1987 column, but once I had modified the device descriptors I could not access any of the drives. Calling True Data Products did not help me, but they offered the advice that OS-9 Level II might still be a bit buggy and that TEAC has stopped making 55Fs. Great. It looks like I may be stuck with a couple of lame drives. Can you help me?

Bryan Mau
College Station, TX

℞ You said you have a DOS 1.0 controller. Assuming it is one of those that needs 12 volts, it may be your problem, since no one on Delphi has reported fully successful Level II operation with one of those. I am also aware of instances with CoCo 3 operation where overheating problems in the computer resulted in problems with disk I/O when running Level II. These were solved by adding a cooling fan.

12-Volt Controller

I have a major problem with OS-9 Level II and my 512K CoCo 3. It will mat or back up disks. Radio Shack told me disk drive alignment was extremely critical for OS-9, and I sent my drives to a Radio Shack repair facility. Still no success. The computer still hangs up and a series of lines moves across the screen if I try to format a disk. From successfully using OS-9 with a friend's system, I am convinced that the problem must lie in the Disk Controller. Perhaps you can give me some advice as to the best next move.

Russell Obbink
Prospect, KY

℞ It appears as though you, too, have an old 12-volt controller. Most likely, if you replace it with one of Tandy's newer 5-volt-only ones, the problems will go away.

Download Troubles

I am having problems getting the programs `ARCHIE.BAS` *and* `ARC.BAS` *to run on my CoCo 2 or CoCo 3. In an attempt to access any of the submenus, I get RG Errors in lines 525, 545, etc. The article by Bruce K. Bell was in the May 1987 issue of* RAINBOW *and was downloaded from Delphi.*

Calvin Fuller
Jacksonville, FL

℞ There were three complaints about the *ARCHIE* series shortly after it was made public, and in each case it was because a tape user had downloaded the tokenized files from the database using *MikeyTerm*. This was a problem because *MikeyTerm* cannot save tokenized BASIC programs to tape. Such saves work fine on disk systems, however. Also, Don Hutchison (DONHUTCHISON) has uploaded `BASFIX`, a program designed to fix tokenized programs downloaded to tape, to the Utilities section of the database on Delphi.

Disto Controller Hang Up

I recently acquired a CoCo 3 to upgrade my CoCo 2 system, which includes a Disto Super Controller with CoCo 3 DOS 1.1, CDOS 2.3, and RS-DOS 1.1. I can't get any of my programs that require an OS-9 boot (such as *MicroIllustrator* and Childpace) to run under any of the DOSs. When I boot up using either the `DOS` command or the boot program supplied with the programs, the OS-9 boot screen is displayed, but then either the computer gets hung up or garbage is displayed on the screen.

John P. Penny
(JOHNPENNY)
Staten Island, NY

℞ Tony DiStefano of C.R.C. Computers, 10802 Lajeunesse, Montreal, Quebec, Canada H3L 2E8, (514) 383-5293, reports that a timing problem in some of the older Disto controllers can cause the computer to "hang up" while accessing a disk. The CoCo 3 update can be obtained for $8. This includes return shipping and handling.

A Major Blowout

While using my system recently I had a "blowout." A flash came from the port, frying everything. I have spares for the CoCo 2 and my controller but my FD-501 drive is down. When powered up, the LED is on, and when activated the motor spins but it returns an I/O Error. The LED always remains on. None of the internal components are visibly damaged or hot. I thought this would only happen if the controller was removed, but it wasn't even nudged. Help!

Bill Nattress
Prospect Hts., IL

℞ In addition to the chips, resistors, capacitors, etc., in the computer and the controller, there are vulnerable components on the PC board attached to your disk drive. Try swapping major components (CoCos, disk controllers and drives) to localize the problem before testing individual piece parts.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

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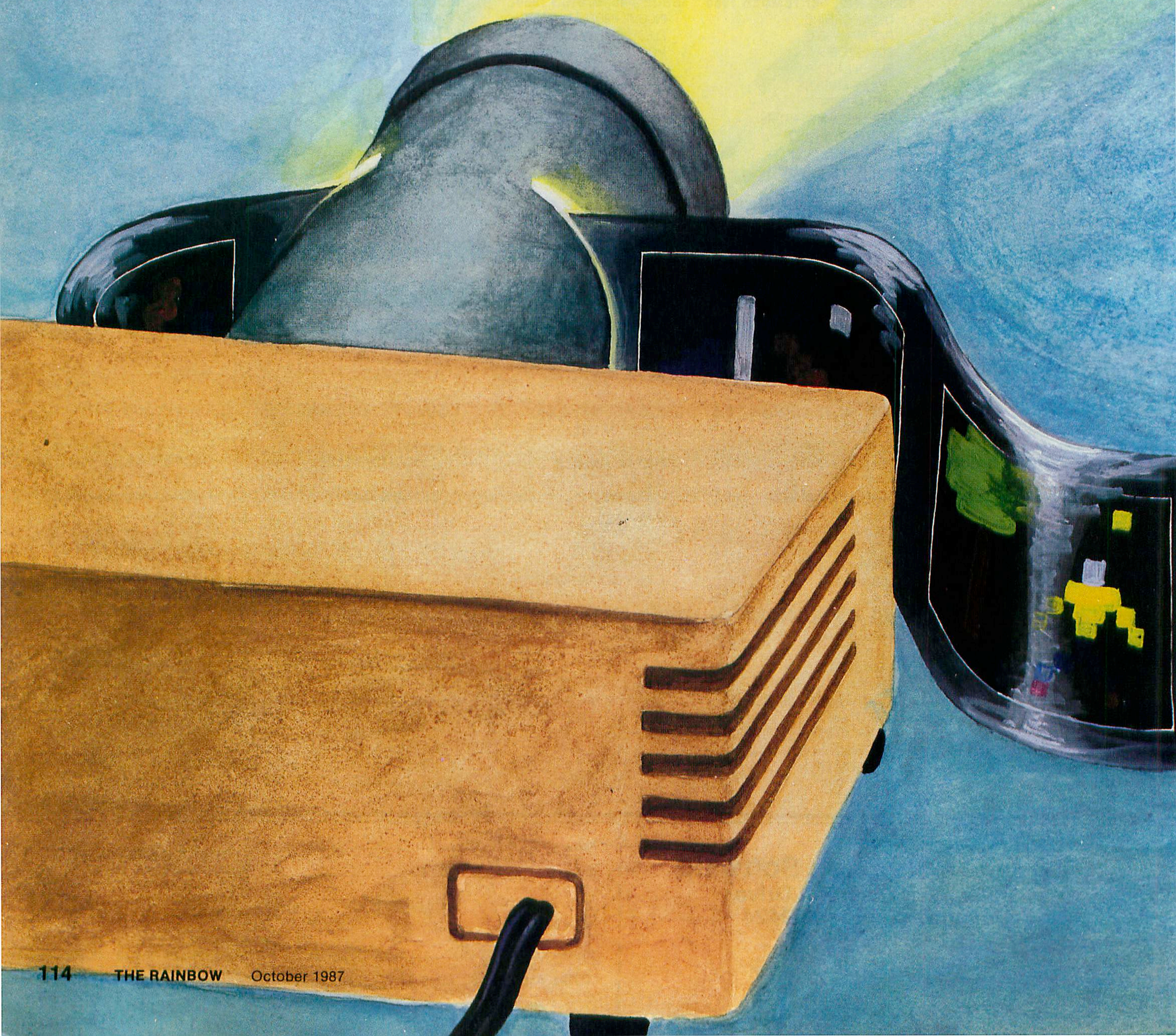
PLEASE CIRCLE
TAPE or DISK

Animation Film Festival

By Solla Carrock



Animate uses the Lo-Res screen to draw up to 20 pictures and save them to tape for later viewing. While the program may be used simply to draw and store pictures, there are many things you can do with the screens created with *Animate*.

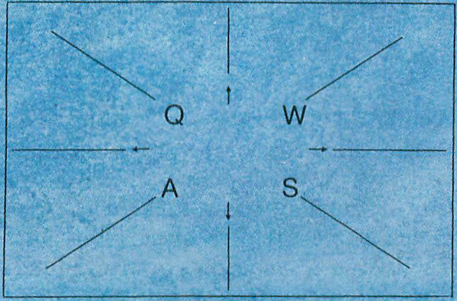
Using its companion program, *Picture Book*, you can create a picture show or a short, animated movie, with or without captions. To aid the animation process, *Animate* allows you to copy one screen to the next, shift screens up, down, left and right, and show them one after another at a speed and order you choose. By choosing a faster speed to show your pictures you may develop short, animated cartoons. The programs may also be used to encourage writing by elementary-age children. As pictures are randomly chosen and displayed, the child can write a sentence about each picture in order to create his/her own story.

Solla Carrock is a writer and artist who has a master's degree in psychology. She has worked with children, both normal and emotionally disturbed, in a variety of settings, including alternative schools and daycare, and has taught and counseled adults as well. She purchased a Color Computer about a year ago for her daughter and has been writing programs ever since. Solla lives in Portland, Oregon.

Once you type in or load the *Animate* program and run it, you will be presented with a list of choices: Draw, Read in pictures from tape, Tape stored pictures, View pictures, Copy last drawing on next screen, Shift a picture, Redo a drawing, Animate, Choose a different picture screen to be last, and End.

Draw

When you choose to draw, you first see a list of drawing directions. Pressing different keys on the keyboard causes a line to be drawn on your screen. There are eight keys that control the direction of the line. These are the four arrow keys and Q, W, A and S. Their directions are given in the chart below. The drawing point is initially in the center of the screen. To draw with it you simply press a direction key and a number from 1 to 9 to tell how far. To move rather than draw, press the D key. To begin to draw, just press the D key again.



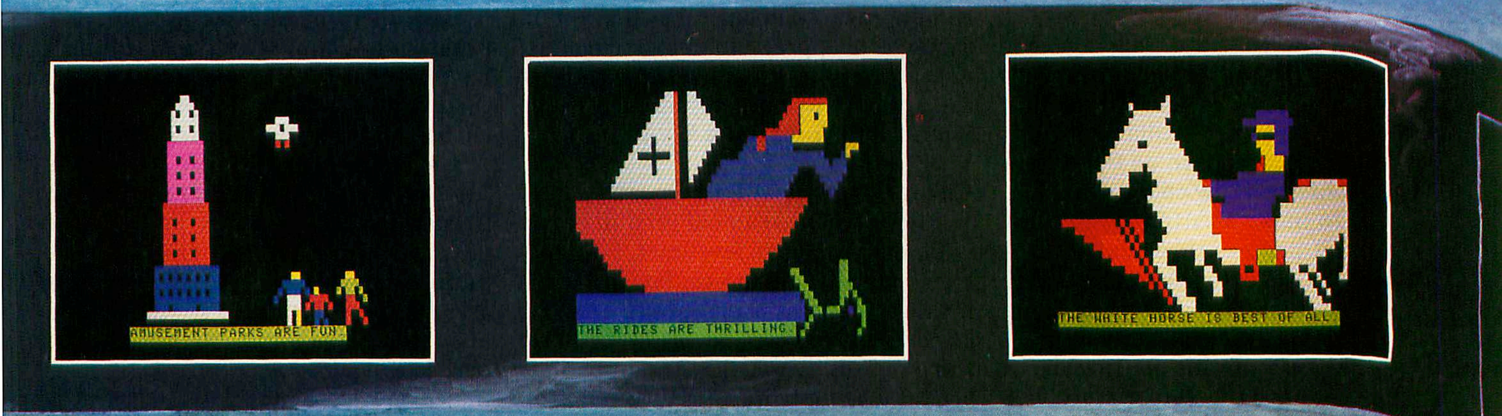
To change the drawing color, simply press one of the color keys (H to P). The keys and their corresponding colors are: H, black (erase); I, green; J, yellow; K, blue; L, red; M, buff; N, cyan; O, magenta; and P, orange.

You may also add a line of text to the bottom of your screen. The text will start at the bottom left-hand corner, taking up the last two drawing rows (the screen holds 32 rows of drawing pixels, but only 16 lines of text). The first line will wipe out anything there. If you type more than one line of text, your whole screen will move up two drawing lines in order to make space for it. So leave space at the top of the drawing if you have a lot of text.

Press T for text. Press ENTER when finished with text, then you can draw again if you wish. If you press T again, you can write text, but it will write over everything in the bottom two drawing rows (or over the last line of text).

You may clear the whole screen by pressing the CLEAR key.

To store your completed drawing in the computer memory, press the @ key. Once this is done, the program will instruct you about how to return to make a new choice. If you choose to



draw again, the next screen will be Screen 2. In this way you can fill up all 20 screens. The program will let you know when all 20 are filled. Any drawing made after that will replace a previous one, beginning with Screen 1.

Read in Pictures From Tape

At the beginning of the program a drawing will be read into Screen 1 and the next into Screen 2, etc. But if screens are occupied by previous drawings, a drawing will move into the next available screen. The program continues reading until all the pictures on the tape are read in or until the 20 screen storage areas are full. You can create a collection of captioned movies or animation features to play back whenever you want. If you finish only part of a movie, you may tape the finished screens, later read them in, add more screens and retape the entire movie.

Reading in the pictures from tape does take some time, however — about 30 seconds per screen, or 10 minutes for 20 screens.

Store Drawings on Tape

Again, saving screens takes about 30 seconds each. One side of a 20-minute tape (10 minutes per side) will hold 20 screen drawings or a 20-screen movie.

View Pictures

This choice lets you view the screens as slowly as you want. This can be helpful if you have lost track of which screen you are on or want to look at a screen at length. You choose when the screen is changed, as opposed to the Animate choice, which changes screens automatically.

Copy Last Screen Onto a New Screen

This is a feature to help you with animation. It copies the last picture drawn onto the next available screen. The drawing is displayed on the screen, and you can make any changes needed. One way to make a cartoon is to draw a beginning picture, then make just a few changes to it in each succeeding frame. This feature makes cartooning much easier to do.

Another use of this feature is in combination with the Shift feature. For example, you could copy Screen 1 onto Screen 2, store Screen 2, then use Shift to move Screen 2 to the right. You could then copy Screen 2 onto Screen 3 and shift Screen 3 to the right, and so on. Using Animate, you would see the object you had drawn moving to the right.

Shift Screen

Use this choice to shift the screen just drawn or copied. You are given a choice of shifting it left, right, up or down.

Redo a Drawing

You do need to know which screen you want to change; if you don't, use View and count the screens until you reach the one to be changed. Then use the Redo option.

> ***"One way to make a cartoon is to draw a beginning picture, then make just a few changes to it in each succeeding frame."***

Animate

This is the core of the program. After you have drawn as many screens as you want, you may show them with Animate. There are five speeds possible. The two fastest speeds work for animation, moving screens so fast that movement is simulated. The slower speeds are more like a movie, with the slowest speed allowing time for reading a caption. To have text in fast animation, simply repeat the words in the same place on subsequent screens. The text will appear to remain still as the rest of the screen appears to move. You are given the option of showing the screens once and stopping or having them repeat until you press a key to stop.

Change Number of End Screen

After I had used an old version of the *Animate* program a few times, I discovered I needed this choice. For instance, my daughter was using it once and she accidentally pressed the BREAK key. For some reason, typing `CONT` and pressing ENTER did not work to return the program. Since the computer hadn't been turned off, I knew her pictures were still there stored in the computer memory, but I had no way to get to them.

Suppose you had eight screens drawn and you wanted to insert a new one after Screen 6. It would take a little manipulation, but here's how to do it:

1) Choose to copy the last screen. Copy Screen 8 onto Screen 9.
2) Change the number of the last screen to 7. Then choose Copy and copy Screen 7 onto Screen 8.
3) Change the number of the last screen to 9. What you have now are nine screens; screens 7 and 8 are exactly the same.
4) Choose to Redo a screen, changing Screen 7 to what you want. Be careful with this choice. It would be easy to wipe out something you want by copying over it. Remember, you can always choose to view the screens to find out exactly where you are.

End

When you make this choice the program asks you several times whether you would like to tape your pictures first so that you don't lose something you want to keep.

The Picturebook Program

This is a program I wrote to make use of a picture file created with the *Animate* program. It is a program for use with a child, preferably one who already can write a little. But with adult help, it can be used with a younger child as well. The idea is to provide a stimulus to write by presenting the child with pictures of a picture book, which the child writes the words for.

When the program is run, it first instructs the user how to load the picture files, which were previously created with *Animate*. Next, the child is asked how many pages (up to 10) he or she wants in the picture book. The pictures for the pages are chosen randomly from those in the `PICTURES` file. Ideally there are 20 pictures for the program to choose from, but you may have fewer in your file, which just means there will be less variety and greater chance of a picture being repeated.

The child is instructed to type a line for each picture and press ENTER when finished. After ENTER is pressed, the next picture is shown. Once all the pictures have captions, the child is asked to press ENTER to see the picture book. Then the entire book is shown, one screen after another, like a captioned movie. At the end, the child is asked if he or she would like to see it again. If not, the text is printed on the screen to be copied, if the child wishes.

When you are creating a picture file with *Animate*, keep in mind that the first line of text the child writes will cover a narrow space at the bottom of the picture. The next line of text and following lines will push the entire picture upward. Therefore, the best approach is to leave the last two drawing rows of the picture blank and also to leave some space at the top in case you have a prolific writer.

Incorporating Pictures Into Another Program

Begin your program with an instruction to go to a block of commands at the end of your program. I have used Line 200 to begin the block, but you may use a bigger number if your program is longer. At the end of the block, return to the main program.

The following is a machine language program to display pictures from among those read into memory areas from the tape file:

```
200 CLEAR 10240,22500:CLEAR
    20,22470:PCLEAR 1:CLEAR
    1000:CLS0
210 DIM A$(10),R(10)
215 DATA &HBD,&HB3,&HED,&H1F,
    &H01,&H10,&H8E
220 DATA &H04,&H00,&HA6,&HB0,
    &HA7,&HA0,&H10
225 DATA &H8C,&H06,&H00,&H26,
    &HF6,&H39
230 FOR J=22470 TO 22489
235 READ DA:POKE J,DA
240 NEXT J
245 DEFUSR1=22470
```

This loads a desired picture file into the memory area of the computer:

```
315 CLS0:PRINT"LOAD THE PIC-
    TURE TAPE. CHOOSE THE ONE
    YOU WANT TO USE, PUT IT IN
    THE TAPE RECORDER AND RE-
    WIND IT. PRESS DOWN THE PLAY
    BUTTON."
320 LINE INPUT"PRESS<ENTER>
    WHEN READY";AN$
330 I=22500:K=I+20*512-1
335 OPEN"I",#-1,"PICTURES"
340 FOR LD=I TO K
345 IF EOF(-1) THEN LD=K:XT=1
    :CLOSE#-1:GOTO 360
350 INPUT#-1,A
355 POKE LD,A
360 NEXT LD
365 IF XT<>1 THEN CLOSE#-1
370 CLS0:PRINT@192,"PRESS ANY
    KEY TO BEGIN"
375 PLAY"CDE"
380 I$=INKEY$:IF I$="" THEN GO
    TO 375 ELSE GOTO 4
```

Line 4 would continue with the main program. Now the pictures are in memory, but to be used they must be called by the program. Let R be the variable that represents the number of the picture you want. Suppose you want to call picture four; use these lines:

```
110 R=4:D=I+(R-1)*512
115 DI=USR1(D)
120 FOR TI=1 TO 3000:NEXT TI
```

(Line 120 is merely a delay to enable the picture to be seen. You may vary the count for a longer or shorter exposure.)

To use another picture, just change Line 110 to set R equal to a different value (1 to 20). Or to have the picture chosen randomly, use these lines instead:

```
105 Z=RND(-TIMER):R=RND(20)
110 D=I+(R-1)*512
115 DI=USR1(D)
120 FOR TI=1 TO 3000:NEXT TI
```

(Questions about this program may be directed to the author at 2555 N.W. Savier #4, Portland, OR 97210. Please enclose an SASE for a reply.) ☐

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Requires 80 column display, OS9 L1/2 $69.00

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SERINA is a debugger for OS9 system modules (device drivers, file managers, etc.). It allows you to trace execution of any system module, set break points, assemble and disassemble code and examine and change memory. There are special provisions for executing code with critical timing loops and for accessing I/O registers. A must for system programmers.

Requires CoCo3, OS9 L2, $139.00
80 col. terminal connected to /T1 or /T2

MSF - MSDos File Manager for CoCo 3/OS9 Level 2

MSF is a file manager which allows you to use MSDos disks directly under OS9. You don't have to change the format of the data before using it!

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800	176		

Listing 1: `ANIMATE`

Make choices

```
1 GOTO 800
5 CLS0:PRINT"MAKE YOUR CHOICE:":
PRINT"1)DRAW":PRINT"2)READ IN PI
CTURES FROM TAPE":PRINT"3)TAPE S
TORED PICTURES" :PRINT"4)VIEW PI
CTURES ":PRINT"5)COPY LAST DRAWI
NG ON NEXT SCREEN"
6 PRINT "6)SHIFT A PICTURE":PRIN
T "7)REDO A DRAWING":PRINT "8)AN
IMATE":PRINT "9)CHOOSE DIFFERENT
 PICTURE SCREEN TO BE LAST":PRIN
T "10)END"
10 INPUT"TYPE NUMBER, THEN PRESS
 <ENTER>.";AN:IF AN<1 OR AN>10 T
HEN 5
15 ON AN GOTO 705,305,505,405,10
95,720,1110,1020,1175,605
```

Draw (Choice 1)

```
50 PP=POINT(X,Y)
51 A$=INKEY$:SET(X,Y,4):RESET(X,
Y):IF A$="" THEN 51
52 IF PP=0 THEN RESET(X,Y):GOTO
55
53 IF PP>0 AND PP<9 THEN SET(X,Y
,PP)
```

To store

```
55 IF A$="@" THEN GOTO 200
60 IF A$="T" THEN GOTO 1150
```

Draw line or move drawpoint

```
65 IF A$="^" OR A$=CHR$(10) OR A
$=CHR$(9) OR A$=CHR$(8)  OR A$="
W" OR A$="Q" OR A$="S" OR A$="A"
THEN GOSUB 100: GOSUB 115
70 IF A$="" THEN 50
```

Change line color

```
75 IF ASC(A$)<81 AND ASC(A$)>71
THEN CC=ASC(A$)-72:GOTO 50
```

Clear screen

```
80 IF ASC(A$)=12 THEN CLS0:GOTO
50
```

Change from draw to move or from move to draw

```
85 IF A$<>"D" THEN 95
90 IF DR=0 THEN DR=1:PLAY "CD":G
OTO 50 ELSE DR=0:PLAY "B":GOTO 5
0
95 GOTO 50
```

Subroutine to read how far to draw or move

```
100 B$=INKEY$:IF B$="" THEN 100
105 B=VAL(B$)
110 RETURN
```

Set points and check that points are not off screen

```
115 FOR TI=1 TO B
120 GOSUB 150:IF X<0 THEN X=0
125 IF X>63 THEN X=63
130 IF Y<0 THEN Y=0
135 IF Y>31 THEN Y=31
140 IF DR=0 THEN SET(X,Y,CC):IF
CC=0 THEN RESET(X,Y)
144 NEXT TI
145 RETURN
```

Subroutine to set line direction

```
150 IF A$="^" THEN Y=Y-1:RETURN
155 IF A$=CHR$(10) THEN Y=Y+1:RE
TURN
160 IF A$=CHR$(8) THEN X=X-1:RET
URN
165 IF A$=CHR$(9) THEN X=X+1:RET
URN
170 IF A$="W" THEN X=X+1:Y=Y-1:R
ETURN
175 IF A$="Q" THEN X=X-1:Y=Y-1:R
ETURN
180 IF A$="S" THEN X=X+1:Y=Y+1:R
ETURN
185 IF A$="A" THEN X=X-1:Y=Y+1:R
ETURN
```

Store drawn pictures in one of 20 storage areas in computer memory

```
200 N=N+1:IF N>20 THEN N=1:NI=1
205 I=22500 +(N-1)*512
206 IF NFLAG=1 THEN NFLAG=0:N=NS
AVE
210 STORE=USR0(I)
215 IF N>=20 THEN CLS0:PRINT"THE
 PICTURE STORAGE SPACE IS NOW FU
LL. SAVE PICTURES ON TAPE BEFORE
 DRAWING MORE, OR YOU WILL LOSE
YOUR FIRST DRAWINGS."
220 LINE INPUT "PRESS ENTER FOR
NEW CHOICE.";AN$
225 GOTO 5
```

Read pictures from tape (Choice 2)

```
305 N=N+1:IF N>20 THEN N=1
310 I=22500+(N-1)*512:K=22500+20
*(512)-1
315 CLS0:PRINT"POSITION TAPE BEF
ORE PICTURE FILE. PRESS PLAY BUT
TON."
320 LINE INPUT"PRESS <ENTER> WHE
N READY";R$
325 OPEN "I",#-1,"PICTURES"
330 FOR LD=I TO K
335 IF EOF(-1) THEN LAST=LD-1:LD
=K:CLOSE#-1:XT=1:GOTO 350
340 INPUT#-1,A
345 POKE LD,A
350 NEXT LD
355 IF XT<>1 THEN CLOSE#-1:NI=1:
LAST=K:PRINT"PICTURE STORAGE ARE
A IS FULL." ELSE XT=0
360 LINE INPUT"PRESS <ENTER> TO
MAKE NEW CHOICE.";AN$
365 N=(LAST-22499)/512:IF N>INT(
N) THEN N=INT(N)+1
370 GOTO 5
```

View pictures one at a time (Choice 4)

```
405 CLS0:PRINT"PRESS<ENTER> TO S
EE STORED PICTURES.PRESS ANY KEY
 TO SEE NEXT PICTURES."
410 LINE INPUT AN$
412 IF NI=1 THEN N1=20 ELSE N1=N
415 FOR D=1 TO N1
420 I=22500+(D-1)*512
425 DI=USR1(I)
430 AN$=INKEY$:IF AN$="" THEN 43
0
435 NEXT D
440 GOTO 5
```

Store pictures on tape (Choice 3)

```
505 CLS0:PRINT"REWIND EMPTY TAPE
. PRESS PLAY AND RECORD BUTTONS.
"
510 LINE INPUT"PRESS <ENTER> WHE
N READY.";AN$
512 IF NI=1 THEN N1=20 ELSE N1=N
515 EP=22500+(N1*512)-1
525 OPEN "O",#-1,"PICTURES"
530 FOR I=22500 TO EP
535 A=PEEK(I)
540 PRINT#-1,A
545 NEXT I
550 CLOSE #-1
555 GOTO 5
```

End (Choice 10)

```
605 INPUT"DO YOU WANT TO TAPE PI
CTURES BEFORE ENDING";AN$
610 IF LEFT$(AN$,1)="N" THEN END
 ELSE GOTO 5
```

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Draw instructions (Choice 1)

```
705 CLS0:PRINT"PRESS <^> FOR UP,
<DOWN ARROW> FOR DOWN,<BACKSPACE
> FOR LEFT,<RIGHT ARROW> FOR RIG
HT,<A> FOR DOWN AND LEFT,<S>FOR
DOWN AND RIGHT,<W> FOR UP AND RI
GHT,<Q> FOR UP AND LEFT.THEN PRE
SS A KEY(0-9) TO TELL HOW FAR TO
 DRAW.;"
708 PRINT"PRESS D TO MOVE, NOT D
RAW, THEN PRESS D AGAIN WHEN YOU
 WANT TO DRAW."
709 LINE INPUT"PRESS ENTER FOR M
ORE DRAWING DIRECTIONS.";AN$
710 CLS0:PRINT"   PRESS THE LETT
ERS H-P FOR DIFFERENT COLORED LI
NES. H IS INVISIBLE.PRESS <CLEAR
> TO CLEAR SCREEN. TO SAVE A PIC
TURE PRESS <@>."
711 PRINT"TO ADD TEXT PRESS<T>.E
NTER WHEN DONE AND YOU WILL BE A
BLE TO DRAW AGAIN."
715 LINE INPUT"PRESS ENTER TO ST
ART DRAWING.";AN$:CLS0
716 CC=4:X=32:Y=15:DR=0
717 GOTO 50
```

Shift picture (Choice 6)

```
720 CLS0:INPUT"CHOOSE SHIFT DIRE
CTION 1)RIGHT;2)LEFT;3)UP;4)DOWN
. TYPE NUMBER AND ENTER.";SD:CLS
0:IF SD<1 OR SD>4 THEN 720.
725 I=22500 +(N-1)*512
730 ON SD GOSUB 750,755,760,765
740 CLS0: PRINT"YOU MUST VIEW SC
REENS TO SEE RESULT OF SHIFT. PR
ESS <ENTER> FOR NEW CHOICE.":LIN
E INPUT AN$
745 GOTO 5
750 FOR T=1 TO 4:A=USR2(I):ST=US
R0(I):NEXT T:RETURN
755 FOR T=1 TO 4:A=USR3(I):ST=US
R0(I):NEXT T:RETURN
760 FOR T=1 TO 2:A=USR4(I):ST=US
R0(I):NEXT T:RETURN
765 FOR T=1 TO 2:A=USR5(I):ST=US
R0(I):NEXT T:RETURN
800 REM DRAWFILE C.SOLLA CARROCK
 2/87
```

Machine language programs

```
805 CLEAR 200,22200
```

Store picture

```
815 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E
820 DATA &H04,&H00,&HA6,&HA0,&HA
7,&H80,&H10
825 DATA &H8C,&H06,&H00,&H26,&HF
6,&H39
830 FOR J=22450 TO 22469
835 READ DA:POKE J,DA
840 NEXT J
845 DEFUSR0=22450
```

Display picture

```
850 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E
855 DATA &H04,&H00,&HA6,&H80,&HA
7,&HA0,&H10
860 DATA &H8C,&H06,&H00,&H26,&HF
6,&H39
865 FOR J=22470 TO 22489
870 READ DA:POKE J,DA
875 NEXT J
880 DEFUSR1=22470
```

Shift picture right

```
885 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E,&H04,&H00,&H86,&H10
886 DATA &HB7,&H57,&HB1,&HC6,&H1
F,&HA6,&H80,&HA7,&H21,&H31,&H21
887 DATA &H5A,&H26,&HF7,&HF6,&H5
7,&HB1,&HA6,&H80,&HA7,&HA8,&HE1
888 DATA &H31,&H21,&H5A,&HF7,&H5
7,&HB1,&H26,&HE5,&H39
889 FOR I=22201 TO 22242
890 READ DA
895 POKE I,DA
900 NEXT I
905 DEFUSR2=22201
```

Shift left

```
910 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E,&H04,&H00,&H86,&H10,
&HB7,&H57,&HB1,&HC6
915 DATA &H1F,&HA6,&H80,&HA7,&HA
8,&H1F,&H31,&H21,&HA6,&H80,&HA7,
&H3F,&H31,&H21,&H5A
920 DATA &H26,&HF7,&HF6,&H57,&HB
1,&H5A,&HF7,&H57,&HB1,&H26,&HE5,
&H39
925 FOR I=22243 TO 22284
930 READ DA:POKE I,DA
935 NEXT I
940 DEFUSR3=22243
```

Shift up

```
945 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E,&H04,&H00,&HC6,&H20,
&HA6,&H80
950 DATA &HA7,&HA9,&H01,&HE0,&H3
1,&H21,&H5A,&H26,&HF5,&HA6,&H80
955 DATA &HA7,&HA8,&HE0,&H31,&H2
1,&H10,&H8C,&H06,&H00,&H25,&HF3,
&H39
960 FOR I=22285 TO 22320
965 READ DA:POKE I,DA
970 NEXT I
975 DEFUSR4=22285
```

Shift down

```
985 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E,&H04,&H00,&HA6,&H80,
&HA7,&HA8,&H20
986 DATA &H31,&H21,&H10,&H8C,&H0
5,&HE0,&H25,&HF3,&HC6,&H20,&HA6,
&H80
990 DATA &HA7,&HA9,&HFE,&H20,&H3
1,&H21,&H5A,&H26,&HF5,&H39
995 FOR I=22321 TO 22356
1000 READ DA:POKE I,DA
1005 NEXT I
1010 DEFUSR5=22321
1015 GOTO 5
```

Animate (Choice 8)

```
1020 CLS0:INPUT"CHOOSE SPEED:1)V
ERY HIGH;2)HIGH;3)MEDIUM;4)SLOW;
5)VERY SLOW.TYPE NUMBER AND ENTE
R";SPEED:IF SPEED<1 OR SPEED>5 T
HEN 1020
1025 IF SPEED=2 THEN SPEED=50
1030 IF SPEED=3 THEN SPEED=500
1035 IF SPEED=4 THEN SPEED=1500
1040 IF SPEED=5 THEN SPEED=3000
1045 CLS0:INPUT"DO YOU WANT TO 1
)STOP AFTER ONE SHOW, OR 2)KEEP
GOING TIL ANY KEY IS PRESSED(TYP
E NUMBER AND ENTER)";KP:IF KP<>1
 AND KP<>2 THEN 1045
1050 IF NI=1 THEN N1=20 ELSE N1=
N
1055 FOR D=1 TO N1
1060 I=22500+(D-1)*512
1065 DI=USR1(I)
1070 FOR TI=1 TO SPEED:NEXT TI
1075 NEXT D
1080 I$=INKEY$:IF I$="" AND KP=2
 THEN GOTO 1055
1085 LINE INPUT"PRESS <R> AND <E
NTER> TO RETURN FOR NEW CHOICE,
OTHERWISE ENTER TO SEE AGAIN.";A
N$
1090 IF LEFT$(AN$,1)="R" THEN 5
```

Copy last picture to new screen (Choice 5)

```
ELSE 1055
1095 I=22500+(N-1)*512
1100 A=USR1(I)
1105 GOTO 716
```

Redo a screen (Choice 7)

```
1110 PRINT"WHICH PICTURE(1-20) D
O YOU WISH TO CHANGE? IF YOU DON
'T KNOW,TYPE 99 TO RETURN TO CHO
ICES.CHOOSE A DIPLAY OF PICTURES
(CHOICE 4) TO FIND OUT THEN RETU
RN HERE."
1115 INPUT N3
1120 IF N3=99 THEN GOTO 5
1125 IF N3<1 OR N3>20 THEN GOTO
1110
1130 NSAVE=N:NFLAG=1:N=N3-1
1135 I=22500+(N3-1)*512
1140 A=USR1(I)
1145 GOTO 716
```

Subroutine to type words on screen

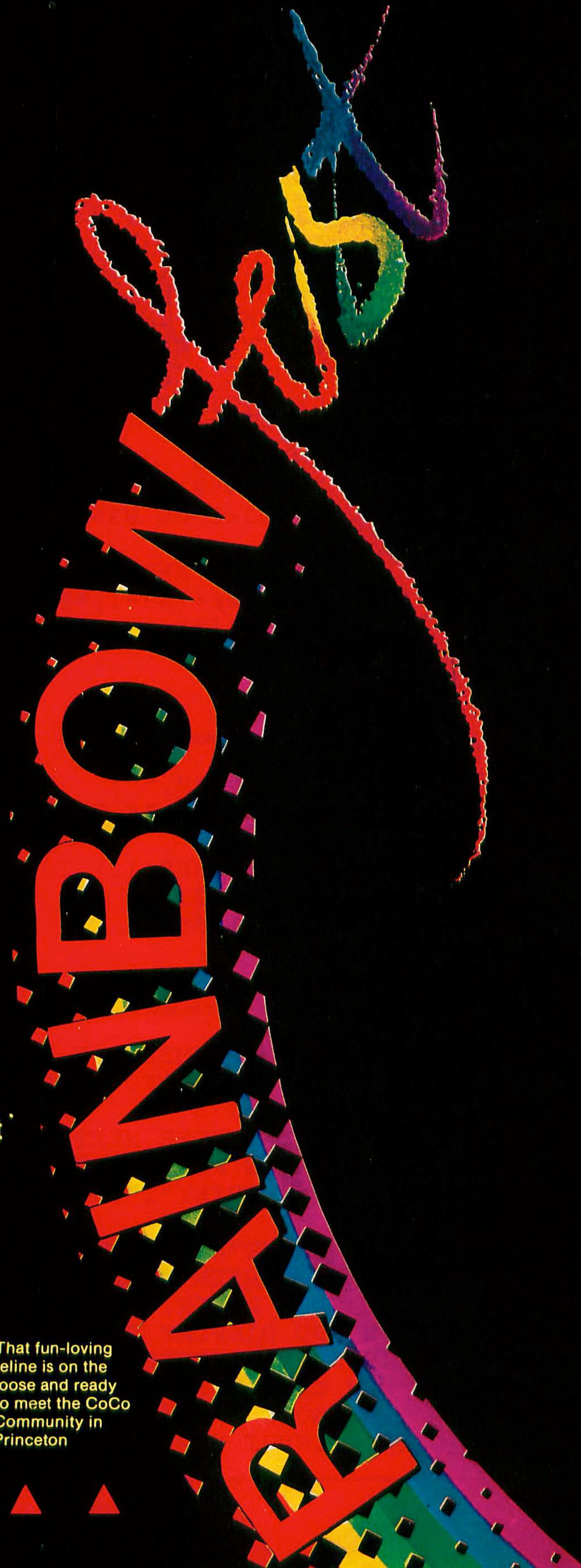
```
1150 PRINT@480,"";
1155 T$=INKEY$:IF T$="" THEN GOT
O 1155
1160 IF T$=CHR$(13) THEN GOTO 50
1165 PRINT T$;
1170 GOTO 1155
```

Change which screen is last (Choice 9)

```
1175 INPUT"NUMBER OF LAST PICTUR
E YOU WISH STORED";N:IF N<1 OR N
>20 THEN 1175
1180 PRINT "THE NEXT SCREEN TO B
E DRAWN ON WILL BE NUMBER";:IF N
=20 THEN PRINT"1"; ELSE PRINT N+
1;
1185 PRINT"ANY PICTURE ALREADY O
N THIS SCREEN WILL BE ERASED IF
YOU DRAW AGAIN, AND WON'T SHOW W
HEN YOU DISPLAY PICTURES."
1190 LINE INPUT"PRESS<ENTER> FOR
 NEW CHOICE";AN$
1195 GOTO 5
2000 INPUT N:PRINT N:GOTO 2000
```

Princeton

October 9-11



RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer. Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time.** Princeton is the show to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

To make it easier for you to participate, we schedule RAINBOWfests in different parts of the country. If you missed the fun in Chicago, why don't you make plans now to join us in Princeton? For members of the family who don't share your affinity for CoCo, RAINBOWfest is located in an area with many other attractions.

A special feature of RAINBOWfest is the **Educational Sandbox**, which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through seventh-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

The Hyatt Regency Princeton offers special rates for RAINBOWfest. The show opens Friday evening with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get your special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

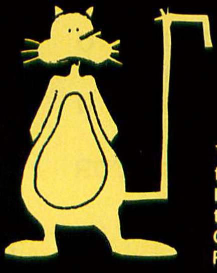
Show Schedule:

Friday evening
- — Exhibits open from 7 p.m. to 10 p.m.

Saturday
- — CoCo Community Breakfast at 8 a.m.
- — Exhibits open at 10 a.m. and close at 6 p.m.

Sunday
- — Exhibits open from 11 a.m. to 4 p.m.

Come meet CoCo Cat in person!



That fun-loving feline is on the loose and ready to meet the CoCo Community in Princeton

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CoCo Community Breakfast

Jim Reed — Executive Editor, Falsoft, Inc.

Our keynote speaker for the traditional CoCo Community Breakfast is Jim Reed, who served for 4½ years as managing editor of THE RAINBOW. Not only does Jim know the CoCo Community intimately, he's been "backstage" at THE RAINBOW since the magazine's early days when it was produced in the basement of Lonnie Falk's house. Jim has the "inside story" on CoCo developments and CoCo people and says his testimony "will tell it all: the good, the bad and the funny."

▲ SPECIAL EVENT!

We're pleased to announce The Educational Sandbox, a joint Tandy/RAINBOW effort. This is a computer workshop for RAINBOWfest kids. There will be two sessions on both Saturday and Sunday. One workshop will be for the kindergarten through third-grade set, and the other for fourth through seventh graders. Each workshop will last between 45 minutes and one hour, and will give the children and their parents hands-on experience in using Tandy computers and software.

Dale Puckett will be autographing copies of *The Complete Rainbow Guide to OS-9 Level II, Volume I: A Beginners Guide to Windows* in the exhibit hall on Saturday and Sunday.

RAINBOWfest - Princeton, New Jersey
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Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

Listing 2: PICTBOOK

```
1 GOTO 200
3 I=22500
```

Randomly choose pictures for the picture book

```
4 CLS0:INPUT"THE COMPUTER WILL S
HOW YOU PICTURES. WRITE A LINE F
OR EACH ONE, THEN PRESS <ENTER>.
 AT THE END THE COMPUTER WILL SH
OW YOU YOUR STORY. TYPE HOW MANY
 PICTURES YOU WANT, UP TO 10, TH
EN PRESS ENTER.";EN:IF EN<1 OR E
N<10 THEN 4
5 FOR N=1 TO EN
6 Z=RND(-TIMER)
10 R=RND(20):R(N)=R
```

Display picture and wait for user to enter a line

```
15 D=I+(R-1)*512
20 DI=USR1(D)
25 PRINT@480,"";
30 T$=INKEY$:IF T$=""THEN GOTO 3
0
35 IF T$=CHR$(13) THEN GOTO 45
40 PRINT T$;:A$(N)=A$(N)+T$:GOTO
 30
45 NEXT N
```

Show each picture with the text written by user

```
50 INPUT"PRESS<ENTER>TO SEE YOUR
 PICTURE BOOK";AN$
55 FOR N=1 TO EN
60 R=R(N)
65 D=I+(R-1)*512
70 DI=USR1(D)
75 PRINT@480,A$(N);
80 FOR TI=1 TO 3000:NEXT TI
85 NEXT N
```

Check to see if user wants viewing repeated; if not print the story on the screen

```
90 INPUT"PRESS R AND ENTER IF YO
U WANT TO SEE IT AGAIN. IF NOT,
JUST PRESS ENTER.";AN$
95 IF LEFT$(AN$,1)="R" THEN GOTO
 55
100 CLS0:PRINT@0,"HERE IS YOUR S
TORY:";
105 FOR N=1 TO 5
110 PRINT A$(N);
115 NEXT N
120 IF EN>5 THEN LINE INPUT"...P
RESS ENTER FOR PAGE 2";AN$
125 FOR N=6 TO EN
130 PRINT A$(N)
135 NEXT N
140 INPUT"DO YOU WANT TO WRITE A
NOTHER STORY";AN$
145 IF LEFT$(AN$,1)="N" THEN END
```

Clear story array if new story desired

```
150 FOR N=1 TO 10
155 A$(N)="":NEXT N
160 GOTO 4
```

Machine language program to display randomly chosen pictures from among those read into memory areas from tape file

```
200 REM PICTUREBOOK C. SOLLA CAR
ROCK 1/87
205 CLEAR 10240,22500:CLEAR 20,2
2470:PCLEAR 1:CLEAR 1000:CLS0
210 DIM A$(10),R(10)
215 DATA &HBD,&HB3,&HED,&H1F,&H0
1,&H10,&H8E
220 DATA &H04,&H00,&HA6,&H80,&HA
7,&HA0,&H10
225 DATA &H8C,&H06,&H00,&H26,&HF
6,&H39
230 FOR J=22470 TO 22489
235 READ DA:POKE J,DA
240 NEXT J
245 DEFUSR1=22470
```

Load desired picture file into memory

```
315 CLS0:PRINT"LOAD THE PICTURE
TAPE. CHOOSE THE ONE YOU WANT TO
 USE, PUT IT IN THE TAPE RECORDE
R AND REWIND IT. PRESS DOWN THE
PLAY BUTTON."
320 LINE INPUT"PRESS<ENTER>WHEN
READY";AN$
325 CLS0:PRINT@202,"TAPE LOADING
":PRINT@224,"THIS WILL TAKE ABOU
T 10 MINUTES"
330 I=22500:K=I+20*512-1
335 OPEN"I",#-1,"PICTURES"
340 FOR LD=I TO K
345 IF EOF(-1) THEN LD=K:XT=1:CL
OSE#-1:GOTO 360
350 INPUT#-1,A
355 POKE LD,A
360 NEXT LD
365 IF XT<>1 THEN CLOSE#-1
370 CLS0:PRINT@192,"PRESS ANY KE
Y TO BEGIN"
375 PLAY"CDE"
380 I$=INKEY$:IF I$="" THEN GOTO
 375 ELSE GOTO 4
```

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Dissecting the Disk Controller

By Tony DiStefano
Rainbow Contributing Editor

A little over a year ago, I started a series of articles describing the LSI (Large Scale Integrated) circuit chips of the CoCo. There was the CPU, the SAM, the PIAs and the VDG along with a whole lot of other TTL support chips. One thing that I did not touch upon is the disk controller. The controller from Radio Shack also has some LSI chips. In fact, the first Radio Shack controller, Catalog No. 26-3022, used a three-chip set. The later controllers used more up-to-date parts. What I intend to do this month is to describe the older controller and the newer controller. In both cases, you will learn more about the FDC (Floppy Disk Controller).

The controller chip that Radio Shack used in their first controller is a part made by Western Digital. The FD1793-02 is a floppy disk formatter/controller. That means that the controller can format a disk as well as read and write to it. This chip had many features: soft sector format compatibility, automatic track seek with verification, single and double density, and IBM 3740 and 34 densities, just to name a few. This was a wonderful chip. It came in a 40-pin package, very compact for its day. But it required at least two other support chips — the WD1691 Data Separator and the WD2143-01 Four Phase Clock Generator. Together these three chips and a half-dozen or so other support chips made up the controller. The power requirements for this setup is 5 volts and 12 volts.

The chips in Figure 1 are the pinouts of the three Western Digital parts that make up the heart of the controller followed by a pin-by-pin description of the FD1793-02 controller. Overlines indicate that the signal is an active low pin.

The other two chips are used to support the FDC. They connect to each other in various ways and connect to other TTL circuitry. It would be a little too long to explain each pin of these two chips and maybe even useless. Yes, useless, because the three-chip FDC combination is now obsolete. Western Digital has since redesigned the FD1793 and made a new chip called the WD1773. This chip has the WD1691 and the WD2143 built right into the new FDC. That's right, three chips in one. Another welcomed feature of the WD1773 is that it does not require +12 volts. It will run on a +5 volt supply only.

This development was great for Radio Shack because they had just released the new CoCo 2. It was smaller, lighter and less expensive than the CoCo 1. Following the new CoCo 2 came a new controller. Radio Shack had to come up with a new controller that did not use +12 volts. It was easy with the new FDC. Not only did it not use +12 volts but was less expensive than the older three-chip set. It also required less support circuitry. Another plus for the new FDC was that it did not have any adjustments. The older 1793 had three trim pot adjustments.

This new controller was great all around. Less money, no +12 volts, only one part, and no adjustments. It also had one more feature: It came in a 28-pin package. Figure 2 shows the pinout of the WD1773 and a pin-by-pin description. Notice that functionally, the parts in Figure 1 and Figure 2 are the same.

Since the introduction of this new FDC chip, many companies have used it to make their own version of Radio Shack's controller. Though the exact circuitry may vary from design to design, they have to follow certain rules. First, the FDC has to be mapped to the same memory area. That requires some sort of memory-mapping chips. The way in which the FDC and the CPU transfer data has to be the same if it is to be compatible.

The technique used in a Radio Shack or compatible controller to transfer data (a complete sector) is not too difficult to understand. It starts off with the CPU setting up the FDC registers for the right track and sector. It then turns on the proper drive motor and drive select. Next, it gives the read or write sector command to the FDC. It checks to see that everything is all right, then, it flips the bit that halts it. This is done by hardware that pulls the HALT line of the CPU low. When the FDC has data ready or needs data from the CPU,

---

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

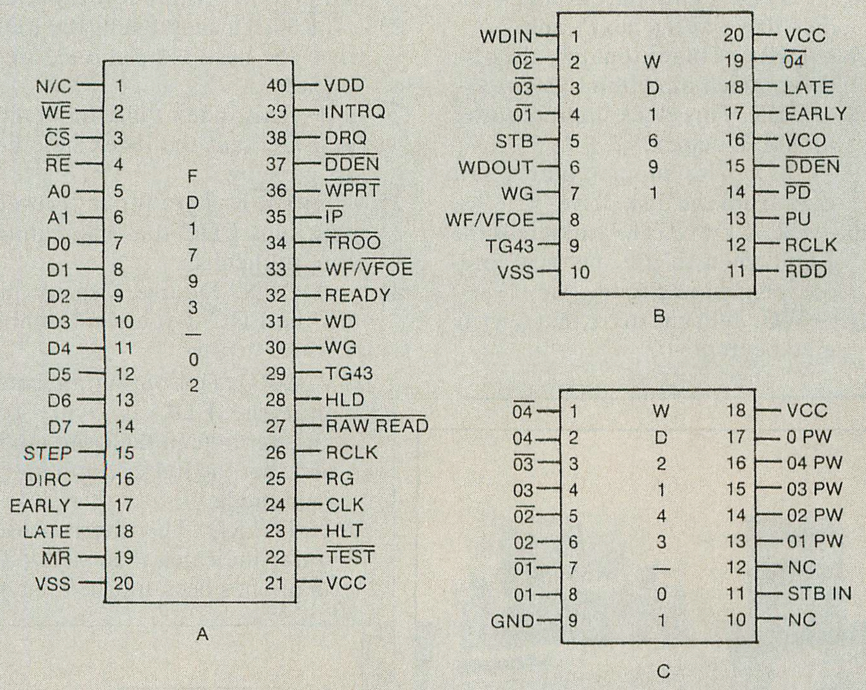

N/C 1
WE 2
CS 3
RE 4
A0 5
A1 6
D0 7
D1 8
D2 9
D3 10
D4 11
D5 12
D6 13
D7 14
STEP 15
DIRC 16
EARLY 17
LATE 18
MR 19
VSS 20
40 VDD
39 INTRQ
38 DRQ
37 DDEN
36 WPRT
35 IP
34 TROO
33 WF/VFOE
32 READY
31 WD
30 WG
29 TG43
28 HLD
27 RAW READ
26 RCLK
25 RG
24 CLK
23 HLT
22 TEST
21 VCC
FD1793—02
A
WDIN 1
02 2
03 3
01 4
STB 5
WDOUT 6
WG 7
WF/VFOE 8
TG43 9
VSS 10
20 VCC
19 04
18 LATE
17 EARLY
16 VCO
15 DDEN
14 PD
13 PU
12 RCLK
11 RDD
WD1691
B
04 1
04 2
03 3
03 4
02 5
02 6
01 7
01 8
GND 9
18 VCC
17 0 PW
16 04 PW
15 03 PW
14 02 PW
13 01 PW
12 NC
11 STB IN
10 NC
WD2143—01
C

Figure 1

1 — NC. This pin has to be left N/C though it connects to a back bias generator.

2 — WE. The Write Enable pin tells the FDC to write data.

3 — CS. The Chip Select is used to map the FDC into the CPU's memory area.

4 — RE. The Read Enable pin tells the FDC that a read cycle is being done.

5 and 6 — A0 and A1. Two address lines select one of the four registers of the FDC.

7 to 14 — D0 to D7. The eight data lines that transfer data to and from the FDC and the CPU.

15 — STEP. This output steps the disk drive to the next track.

16 — DIRC. This output tells the disk drive which direction to step.

17 — EARLY. This indicates an early write precompensation.

18 — LATE. This indicates a late write precompensation.

19 — MR. A low on this pin resets the FDC completely.

20 — VSS. This line is the ground line for the FDC.

21 — VCC. This line requires +5 volts.

22 — TEST. This pin is used for testing and should be kept high during normal operation.

23 — HLT. The Head Load Timing signal is high when the head is engaged.

24 — CLK. This input requires a free-running 1MHz. clock.

25 — RG. The Read Gate is used to synchronize the external data separators.

26 — RCLK. The Read Clock is a square-wave signal derived from the data stream.

27 — RAW READ. Data stream directly from the drive.

28 — HLD. Head Load controls the loading of the disk head against the floppy disk.

29 — TG43. This outputs tells the support circuits that the head is sitting on a track greater than 43 (for 80-track drives).

30 — WG. Tells the drive that a write is to be done.

31 — WD. The Write Data output contains the data and address marks to be written to the drive.

32 — READY. The Ready input tells the FDC that the disk is ready for a read or a write operation.

33 — WF/VFOE. A bi-directional signal. When WG=0, a low will terminate any write command. When WG=1, this pin remains low until the end of the data field.

34 — TR00. This input tells the FDC when the head is positioned over Track 0.

35 — IP. This Index Pulse input tells the FDC that the index hole has just gone by.

36 — WPRT. The Write Protect input tells FDC that you cannot write to the disk.

37 — DDEN. Double Density pin tells the FDC if you want double or single density.

38 — DRQ. This output indicates that the FDC is ready for another byte in the write mode and that the buffer is full in the read mode.

39 — INTRQ. The Interrupt Request indicates that any command has been finished.

40 — Vdd. This input requires +12 volts.

it unhalts the CPU via the DRQ line of the FDC. The CPU then stores that byte of data into memory on a read or fetches another byte from memory on a write and then halts itself again. This procedure is repeated until all the data of that sector is transferred. At this point the FDC fires the INTRQ; this signal is connected to the IRQ of the CPU. The IRQ routine then gets the CPU out of this loop and continues to the rest of the read/write sector software.

This procedure is the same for all controllers that hook to the CoCo. Until now that is. Disto is soon to announce a new controller called the Super Controller II. This controller will do everything the Radio Shack controller can and more. It also has a different way to transfer data. It has built-in RAM memory and the support circuitry to transfer data to and from this RAM without the use of the CPU. In the OS-9 operating system, this is a big boost. Data is transferred without the use of the HALT line. The CPU does not have to mask the interrupts. That means that once the CPU gives the command to the FDC, it is free to do other things and return to get the data when the FDC is finished. That means no more missed characters on the keyboard when a disk operation is running.

1 — $\overline{CS}$. The Chip Select is used to map the FDC into the CPU's memory area.

2 — R$\overline{W}$. The Read/Write pin tells the FDC what cycle is being done.

3 and 4 — A0 and A1. Two address lines select one of the four registers of the FDC.

5 to 12 — D0 to D7. The eight data lines that transfer data to and from the FCD and the CPU.

13 — $\overline{MR}$. A low on this pin resets the FDC.

14 — GND. The ground return for all signals.

15 — Vcc. Power supply of +5 volts only.

16 — STEP. This output steps the disk drive to the next track.

17 — DIRC. This output tells the disk drive which direction to step.

18 — CLK. This clock input requires an 8MHz. clock.

19 — $\overline{RD}$. This input requires raw data from the disk drive.

20 — PRECOMP. This input tells the FDC when to use the write precompensation circuit.

21 — WG. Tells the drive that a write is to be done.

22 — WD. The Write Data output contains the data and address marks to be written to the drive.

23 — $\overline{TR00}$. This input tells the FDC when the head is positioned over Track 0.

24 — $\overline{IP}$. This Index Pulse input tells the FDC that the index hole has just gone by.

25 — $\overline{WPRT}$. The Write Protect input tells FDC that you cannot write to the disk.

26 — $\overline{DDEN}$. Double Density pin tells the FDC if you want double or single density.

27 — DRQ. This output indicates that the FDC is ready for another byte in the write mode and that the buffer is full in the read mode.

28 — INTRQ. The Interrupt Request indicates that any command has been finished.

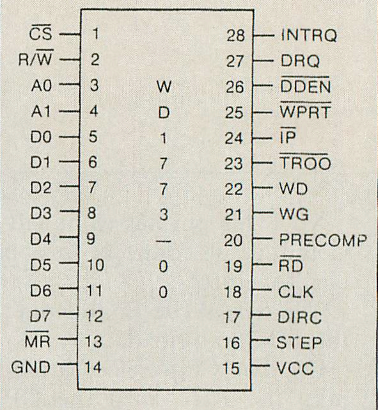
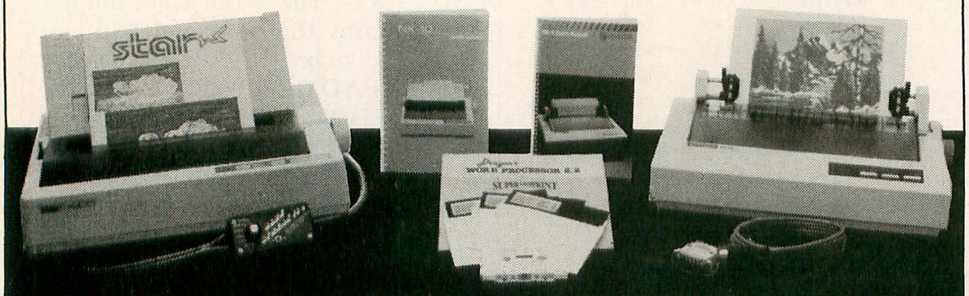


Figure 2

Information for this column was taken from *Storage Management Products Handbook 1986*, Western Digital Corporation, Literature Department, Irvine, California, and *Color Computer Disk Interface*, Tandy Corporation, Fort Worth, Texas.



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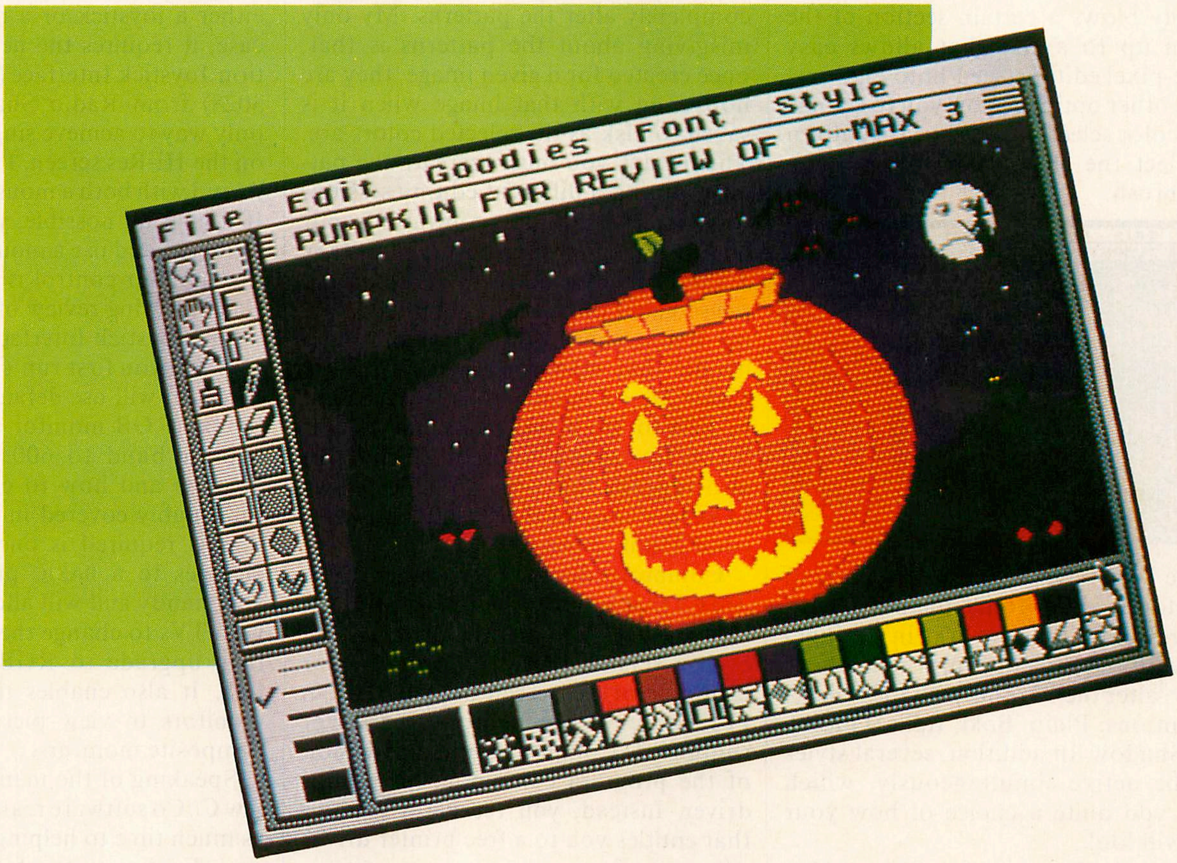


Software CoCo 3

Color Max 3 — Graphics Editing System

For the first month or so after the introduction of the Color Computer 3 very little software existed that would take advantage of this new machine's enhanced powers. Soon we began to see a few minor pieces of software enter the market. We had even seen a few simple graphics programs. But it was not until the recent Chicago RAINBOWfest that we saw a full-blown graphics editing system that utilized nearly every feature of the CoCo 3. To be sure, I am speaking of *Color Max 3* from Computize.

Color Max 3 is a full-featured graphics editor with a simple-to-use point and click user interface such as is found on other systems and even on some programs designed for earlier CoCos. A point and click interface means exactly what it says. First you "point" at a picture of what you want to do (an icon) with your mouse or joystick and then you "click" the button to select that option. It is easy enough that even young children can learn to use the program in a short amount of time. That is, if they can get mom and dad away from the system long enough.

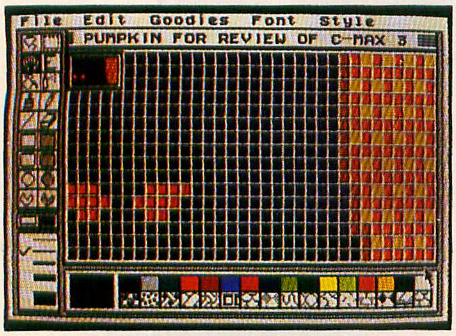
Don't let its simplicity fool you, though. *Color Max 3* offers complete control over an image 320-by-200 pixels in size, in any 16 of 64 colors. It supports the use of both RGB and color composite monitors. You can edit your picture on a pixel-by-pixel basis or make sweeping changes to the image with one or two quick mouse movements. At the touch of a button, you can add text to the drawing in any of several fonts and styles. Your imagination is the limit to what you can create.

I am by no means an artist. In fact, my main interest in computer graphics stems from my technical background and the need to create circuit diagrams. However, Photo 1 will give you some idea of what a neophyte da Vinci can do in just a few hours. It also gives you some idea of what *Color Max 3* looks like on the screen. (Both Photo 1 and Photo 2 were taken from a Radio Shack CM-8 RGB monitor.)

The words you see across the top of the screen are the titles for the pull-down menus. When you click on one of these titles, a menu full of options will scroll down the screen. The File menu lets you save and load pictures as well as clear the screen or print an image.

The Edit menu gives you the ability to transfer and copy sections of the screen from one place to another. You can use options under this menu to save certain portions of the screen, as well. Other options allow you to invert an image or "flip" it horizontally and/or vertically.

The Goodies menu offers several interesting items. It is through this menu that you enter "Fat Bits." Fat Bits literally blows a certain section of the screen up to a size that allows easy single-pixel editing (see Photo 2). Some of the other options allow you to change your color selection or edit a fill pattern or select the shape and color of the paintbrush.



The Font menu lets you select any of the standard 11 fonts included with *Color Max 3*. It also works in conjunction with the Style menu, which allows you to alter the 11 fonts with the following options: Plain, Bold, Italic, Outline and Shadow. In addition, several styles can be active simultaneously, which gives you quite a choice of how your text will look.

On the far left side of the *Color Max 3* screen you will see the usable icons. These allow you to select which basic designs *Color Max 3* will draw next. If you click on the Box icon, *Color Max 3* knows you want to draw boxes. If you click on the Pencil icon, you are all set to do some freehand drawing. Other icons include the Eraser, Circle, Paintbrush, Text Entry and Edit Lasso. The most used functions of *Color Max 3* are available through the icons.

Just below the icons is a section that allows you to select how wide you want lines to appear when drawing lines, circles and boxes. Just click on the line width you desire and off you go.

To the right of the line width section are the fill patterns and colors. You can select any of the 16 colors in the top row as your foreground and/or background colors. Also, through the Goodies menu, you can change which colors you are allowed to use. Color change is done by choosing a mix of different hues of red, green and blue, if you are using an RGB monitor. If you are using a composite color monitor, simply select an intensity level for the colors available in the CoCo 3's CMP mode.

The bottom row on the screen indicates the patterns you can use to fill sections of your picture. These patterns are all black-and-white when you first run *Color Max 3*, but, again, you can edit colors into the patterns as well as completely alter the patterns. My only misgiving about the patterns is that, once created for a given image, they are not saved with that image when it is saved to disk as the selected colors are. This means you must recreate the patterns during a different editing session.

Now, let's talk about printing your picture. Keep in mind that *Color Max 3* allows the use of up to 16 colors on the screen. I don't know about you, but my Radio Shack DMP-200 can't quite handle that many colors. In fact, the *Color Max 3* manual tells you it might be best to use black-and-white designs if you are using a dot matrix printer. It also suggests that one of the best ways to keep a copy of the screen is to use a good 35mm camera.

Computize does sell versions of *Color Max 3* that support the Epson printers, Radio Shack dot matrix printers and even a version that produces 16-color printouts of the screen on a CGP-220. For those whose printer is not yet supported, Computize offers a version of the program containing no printer driver. Instead, you receive a coupon that entitles you to a free printer driver when one for your printer is written. Each copy of *Color Max 3* includes only one printer driver. This is an interesting and commendable way to deter software piracy, but it can be annoying to those people lucky enough to own two different printers.

Color Max 3 can be controlled with either a joystick or a mouse. In either case, it requires the new High Resolution Joystick Interface (Catalog No. 26-3028) from Radio Shack. This is the only way to achieve single-pixel control on the Hi-Res screen. I have used *Color Max 3* with both a mouse and a joystick. If it is at all possible, you will want to purchase and use a mouse. You will find that pointer control is much smoother (see following review of the High Resolution Joystick Interface).

When you first run *Color Max 3*, the program will use defaults that set it up for the RGB monitor and also set the printer baud to 600. Both of these defaults and how to change them are thoroughly covered in the manual. All that is required is one or two simple changes to a BASIC program. This is very handy and will allow present users with TVs to change their systems when they upgrade to RGB-capable monitors. It also enables those with RGB monitors to view pictures created on composite monitors.

Speaking of the manual, I have seen few CoCo software manuals that devote as much time to helping the user as this one. Each aspect of the program is

Hardware CoCo 3

High Resolution Joystick Interface

The new Radio Shack High Resolution Joystick Interface is both literally and figuratively a "black box." It is a design marvel that will allow your CoCo 3 to access any of its possible 640-by-192 pixels. Simply connect the interface to your CoCo 3's cassette port and one of the two joystick ports. Then plug your joystick or mouse into the port on the interface.

Unfortunately, the interface is not easily programmed with BASIC. Because of speed requirements, the software must use machine language drivers to read the joystick. This, however, is not a major drawback when you consider the abilities of the unit. Also, plenty of software is, and will be, available to utilize the interface.

Personally, I find the results far better when using a mouse with this unit. When using a joystick, screen movement seems jerky. I also found that, when setting points on the Hi-Res screen, the joystick will sometimes set two dots in different locations. Before I go any further, I must say that this is not the fault of the interface or the software! It has happened with several different programs, and the problem clears up completely when a clean mouse is used. It appears that the joystick ports get a little dirty and cause the erratic behavior. The joystick seems to work just fine if you use a little tuner cleaner to clean the ports up before using it. I have seen the problem occur when the mouse is dirty, as well. Once cleaned, though, everything works OK.

I must admit, I was quite surprised that a simple product could produce such accuracy. Needless to say, just as a hammer is the first important tool a carpenter has, every CoCo 3 owner should have one of these.

(Tandy Corporation; $9.95. Available in Radio Shack stores nationwide.)

covered. While you really don't need the manual to get started with the software (it really is user-friendly), it is handy for some of those complicated maneuvers *Color Max 3* allows. In addition, the 25-page manual explains some of the technical and background concepts behind the software. I tip my hat to Computize for their consideration in this area. It really shows their support for the user.

Another area in which *Color Max 3* is supported is optional utility programs. In addition to offering several versions of *Color Max 3*, Computize sells picture converter utilities, which let you convert pictures created with *CoCo Max*, *Graphicom* and even the Atari ST to a format compatible with *Color Max 3* (the MGE format used by *Color Max 3* is designed to allow full use of the CoCo 3's capabilities and, additionally, to allow easy compression of graphics files to reduce the amount of required disk space). Also available is a set of over 25 additional *Color Max 3* fonts from Derringer Software and even a Font Editor, which allows you to create your own font designs. Unfortunately, we have not yet received these items for review. However, we will let you know about them as soon as they are submitted.

All in all, *Color Max 3* is a well-designed graphics editing system for the CoCo 3. It takes full advantage of many of the CoCo 3's capabilities and is very easy to use. I can certainly recommend this program to anyone whose interests include computer graphics.

(Computize, Inc., P.O. Box 207, Langhorne, PA 19047, 215-946-7260; $59.95)

— **Cray Augsburg**

Software CoCo 3

My Artist — Graphics Editor for the CoCo 3

I remember well the rush of excitement that overcame me when I first laid eyes on my CoCo 3. New, improved BASIC commands! Up to 80-by-24 true text modes! Direct monitor connectors! Enhanced keyboard! Ahh — but all these features paled next to the feature that really made the CoCo 3 shine — graphics! Up to 16 different colors from a palette of 64 different colors, shades and hues, and resolution as high as 640-by-192. With all this power waiting to be tapped, I knew it would not take long for the software companies to release new software to bring out the Picasso in all of us.

My Artist by Seesof is a graphics editor written in Super Extended BASIC for the CoCo 3. It supports the four new HSCREENs, which vary in resolution from 320-by-192 to 640-by-192 with four colors available. Saved in an unprotected format to allow the user to easily back up the original disk for safekeeping, the program is simple to load and run.

Upon running the program, the user is presented with a brief title screen and has the option to load a previously stored creation, or create a new one. At this point either the stored graphics are loaded, or the user is prompted to select from the various graphics modes. After this, the graphic screen is presented, and editing can begin.

Because the entire screen is used for your artwork, there are no icons or other point-and-click type amenities. Instead, the user selects the choice of tools from the keyboard. Various commands support the drawing of simple points, lines, boxes, filled boxes and ovals. In most cases, the user keys the appropriate letter, selects the initial point, presses the firebutton, relocates the cursor to the terminal point, and presses the firebutton again.

The current location is indicated by a small crosshair cursor. Movement is achieved by pushing the joystick in the direction you want the cursor to move. In the fast mode, the cursor moves five to 10 pixels at a time. In the slow mode, the cursor moves on a pixel-by-pixel basis. These modes are selected by the F2 and F1 keys, respectively. The user may also move directly to a desired location by choosing the 'J' option which moves the cursor to a point on the screen directly represented by the X,Y coordinates of the joystick. However, because the resolution of the screen is up to 10 times greater than that of the joystick, the user will need to choose the slow mode afterward to achieve precise positioning.

Some of the other supported commands include copying, whereby the user can store a portion of the screen contained in a rectangle of any size and duplicate it in any area as many times as desired; text mode, which allows the user direct entry of characters from the keyboard; and paint, which allows the filling of an enclosed area with any available color. The hue command allows the selection of the various shades available for the palette slots, while the color command selects the current color in use. Save allows the pictures to be stored either to disk or cassette. Finally, a help screen is available at the touch of the ? key.

Unfortunately, I found the program difficult to use and flawed to a certain extent. The program does not support

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a true 'undo' command, which I came to regret quite often. The manual suggests that the user save the file prior to using the Paint command; however, I cannot envision doing this every five to 10 minutes, as it is a tedious process for the disk user and takes up quite a bit of disk space, and for the cassette user, it is even more tedious. Also, the Paint command itself was very difficult to use, as the user is required to know the numeric code representing the border of the object. The manual states that the user should write down the color name and its code value, but this is an inconvenience that could have been easily avoided. I would suggest that the new user make his/her own 'crib sheet' until he/she is familiar with all the commands.

On the plus side, *My Artist* has adequate documentation and is suited for very simple pieces of work.

(Seesof, P.O. Box 574, Beaufort, SC 29901, 803-524-0116; $14.95: First product review for this company appearing in THE RAINBOW)

— David C. Barry Jr.

Software CoCo 1, 2 & 3

Leonardo's Pencil — Draw Special Graphics

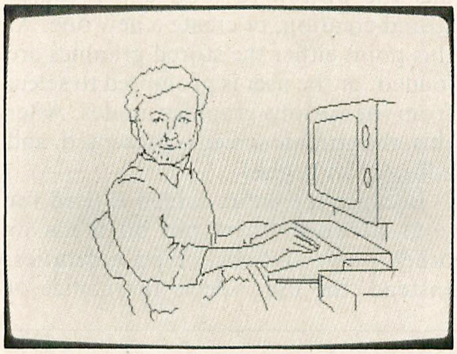
Leonardo's Pencil is a BASIC program that lets you create very detailed graphics. It also converts your picture into a stand-alone BASIC program you can save to tape or disk for later use.

After you load and run the program, you must center the joystick (your drawing tool). Once this is accomplished, press the firebutton to see the go-ahead message. Type RUN and press ENTER, and you see the title screen of the program. Pressing any key on the keyboard or the firebutton brings up the drawing board. Written across the bottom of the board is a list of options: Keys, Speed, Erase, Undo, Test, Basic, Hcopy and Art. The first option shows which keys and what direction they move the cursor. You can select the drawing Speed (slow or fast); Erase a drawing; back up and erase the previous move with Undo; have the computer draw your graphic with Test; save your graphic as a stand-alone BASIC program; get a Hard copy of the BASIC commands used in your graphic; or load a previously created graphic to edit with the Art option.

If you are using the joystick to make your drawing, move the cursor with the lever, and press the firebutton when you want to draw a line. When using the keyboard as your drawing tool, you can do exact, one-pixel-at-a-time drawings. Using one of the eight directional keys allows you to move the cursor one pixel up, down, left, right or any of the four diagonals. Pressing ENTER draws a line.

To load a graphics screen to be used with the Art option, you must first save the BASIC program in the binary format. The instructions are very well-written on this point, but I misread this part and couldn't get the graphics program to load back into *Leonardo's Pencil* to edit it. I called James M. Bennett, who developed the program, and he patiently explained the procedure to me. This was impressive, because one of the main things I look for when I buy software is after-sale support.

There is a second program included called *Paint*. With this program you can have your computer write routines for coloring the outline drawings you have created with *Leonardo's Pencil*. When you have colored your picture, you can save the program in BASIC. This will not be a stand-alone program so you will have to merge it with a drawing program preceeding it.



Jim has suggested you make a drawing with a felt marker on clear plastic wrap and tape it to your monitor. This way you can simply trace the drawing. Jim included a demonstration program on the cassette version and it really shows what you can draw using this program! I have been using *Leonardo's Pencil* since I received it for review, and although I am not very good at drawing with the joystick, I was able to draw a very respectable bear using the keyboard.

I am very impressed with the ease of operation and user-friendliness of this program. The instruction manual is well-written and easy to understand. I would certainly recommend *Leonardo's Pencil* for anyone who would like to be able to create special graphics.

(E.Z. Friendly Software, 1308 Belmont Ave., Front Royal, VA 22630, 703-635-1354; Tape $10.95; Disk $12.95 plus $1.50 S/H: First product review for this company appearing in THE RAINBOW)

— John H. Appel

Software CoCo 3

Polytint — Changes Palette Colors

With so many new features to play with, it was only a matter of time before CoCo 3 products that use those features hit the market. *Polytint* is just such a program, designed to copy PMODE 3 or 4 images to the Hi-Res 16-color screen. On that screen, you can modify the image by changing colors to any 16 you select from the 64 possible choices.

The program performs as advertised. Images are quickly transferred to the left four-fifths of the Hi-Res screen from your disk. The right fifth is dedicated to a box showing the 16 available colors and offering instructions on how to proceed. A lot of time and effort went into this program, and it shows in the fine online help it offers.

First up when running the program is a menu that lets you choose between loading and coloring a new image or looking at a previously colored image. For now, we will choose the first — load and color. You are prompted for a filename (the extension .BIN is assumed as this is a disk-only program) and the file is loaded. It takes about three seconds to move the image to the Hi-Res screen. The picture appears on the left four-fifths with the right fifth displaying your palette.

Now, you can begin to change palette colors to suit your taste. Color selection is made by positioning the cursor in front of a palette box (using the up or down arrow keys) and entering the numeric value desired for that slot. The small box displays the color you selected and you can proceed to the next slot or change this slot again. You might want to use one of the fine public domain programs to familiarize yourself with the colors and their values, as stepping through the other 48 values to find 16 you like can take some time.

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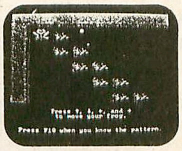
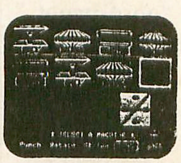
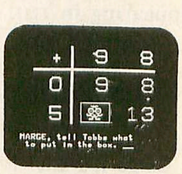


Press ↑, ↓, ←, and →
to move your frog.
Press F10 when you know the pattern.

THE FACTORY
3 level program challenges users to create geometric items on a user designed machine. Grade 4 - adult.



TEASERS BY TOBBS
Solve math puzzles on a grid. Tricky and challenging on 6 levels. Grade 2 - adult.



MARGE, tell Tobbs what
to put in the box. _

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After color selection is complete, you can start coloring your picture. The cursor is placed in the first area available for coloring and can now be manipulated with the right and left arrow keys. The cursor appears as a small flashing graphics block. Color selection is made by entering the palette slot desired. The slots and their colors are still on display on the right fifth. When ENTER is pressed, the area is colored. Press one of the arrow keys to move on to the next area to color. It's that simple.

When you have finished coloring your picture, you can save the image or recolor any portion of the picture. This program was written before the advent of editors such as *Color Max 3*, so the save is not in a true Hi-Res format. It is quite ingenious, though. The regular `PMODE 3` or `4` screen is saved, with the palette values, X and Y coordinates for painting and the paint value, appended to the end of the image. Thus, a fairly complex image (requiring many places to be painted) takes more disk space than a rather simple image.

The other option on start-up is to view a picture already colored. This option loads the image, copies it to the Hi-Res screen and colors it. You may then observe the picture. When you are through looking it over, you return to the main menu and can either look at another picture or start coloring another image.

A second program is included that enables you to add on to the Hi-Res screen. Once an image is loaded and colored, press the BREAK key and exit the main program. Then run the second program (called `ADDITS`), which clears the color block from the right fifth of the screen. By adding BASIC statements to the `ADDITS` program (the manual tells you how), you can use that right fifth and add anything to the picture — or, if you want, you can add anything to the left four-fifths, as well.

While you can save the updated image, the manual advises you to save your own version of the `ADDITS` program to conserve disk space. The next time you want to view that picture, you follow the procedures above, substituting the name of your custom version of the `ADDITS` program.

There are a few very minor flaws in the program, but some of these cannot be helped. One such flaw is that extremely complex images cannot be loaded as there are too many paint locations. The manual warns about this problem, although I couldn't find an image that wouldn't work. You are allowed up to 2,047 different paint locations, more than enough for the average picture. Another problem is the size of the paint cursor. Although it flashes, it is still very small and difficult to find on occasion. A small plus symbol (+) would better suit the purpose.

The last problem is something that may be ongoing trouble. Because there is no real standard for saving Hi-Res screens (yet), the method used works. When a standard is adopted by the CoCo community, though, it is my suggestion that the program be changed to reflect that standard and to make it compatible with what I am sure will be a flood of other programs.

All in all, *Polytint* is a fine program. The manual is very clear and not too technical. You have not just one, but four different examples to play with. The program is virtually "goof-proof." The price makes it one of the CoCo 3 bargains.

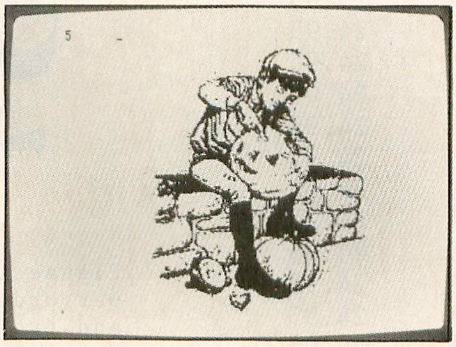
(Boiling Spring Lakes Software, P.O. Box 2536 B.S.L., Southport, NC 28461, 919-845-2881; $17.50 plus $1.50 S/H: First product review for this company appearing in THE RAINBOW)

— D.A. Ferreira

Software CoCo 1, 2 & 3

Art-Deli — A Smorgasbord of Images

As editor of your club's newsletter, you find yourself in somewhat of a jam. The Christmas edition is due in the mail in three days and you don't have a nice picture for the cover. There isn't enough time to create your own, and everyone has seen the picture you used last year.



This is where *Art-Deli* comes to the rescue. The package consists of 10 double-sided disks with a total of 440 different pictures. They are all `PMODE4` black and white images, and most are printer-ready.

All of the images are high quality. They load easily into your favorite graphics editor. This is beneficial, as there are a few pictures that require some sort of text or other addition. Be warned, though — the pictures are not meant to be colored. You may add a background color to most, but given the nature of the digitized images, even that may require work (such as closing off areas you don't want painted).

Almost all of the pictures are ready to go as-is, though. And if you don't have access to a graphics editor (*McPaint*, *CoCo Max*, *Graphicom*, etc.), never fear. A utility is provided that allows you to view all the pictures on the disk. Once loaded, any screen dump that works with your printer will do the trick.

The cost may be a little prohibitive for the average club, so there is an option that allows you to buy one double-sided disk at a time. A single disk gives you 44 pictures with the following titles: Travel, Pets, Christmas 1 & 2, Halloween, Thanksgiving, Winter, New Year, Patriotic, Creative Art, People 1 & 2, Spring, Summer, Easter, Valentines, Sports, Fun Sports, Food, and the ever popular Miscellaneous. When ordering the single disk, you can specify any two of the above titles.

Finances permitting, the way to go is to purchase the full set. There are more than enough pictures to justify the cost. Also, when purchasing the full set, a book showing the entire gamut of available images is included, thus saving the tedium of looking through each disk for just the right picture.

In short, *Art-Deli* is the perfect resource for the newsletter editor, club leader or anyone who organizes activities. The package is a virtual smorgasbord of images for special occasions.

(Specialty Projects, 4810 McCrory, Memphis, TN 38122, 901-682-8737; $12.95 per disk; $99.95 for the set plus $3 S/H: First product review for this company appearing in THE RAINBOW)

— D.A. Ferreira

Software CoCo 1, 2 & 3

Scan and *Restorit* — Recovers Lost Files

Scan is a program designed to scan a binary file and display to the screen and/or printer any ASCII sequences that it finds. The author mentions one intended usage of *Scan*, that of finding the right command to use in an Adventure game.

The program is distributed in unprotected form on disk and requires at least 32K of memory in which to operate. It is loaded into the computer with the `LOADM` command from BASIC.

Scan is a machine language utility that contains its own disk module, presumably for purposes of independence from the various incompatibilities between several of the alternative disk ROMs in use. It is invoked with a command line from BASIC in the form of `EXEC` *filename*`.`*ext* `>DEV`. The `>DEV` parameter, if replaced with `>PRN`, will route all output to the printer. If left blank, output will be sent to the screen.

The special command `EXEC'VER` would not work. However, most people would not be too concerned with which version of the program is in use, so I don't feel this deficiency is of major importance.

Scan worked well when tested on several M/L files. It displays only the ASCII codes within a file, and this could be an attractive feature when scanning Adventure games. I think that *Scan* belongs with every true Adventure gamer. It is also a convenient, clever utility for the curious.

Restorit is a program designed to aid the novice user in restoring text files that have been made unreadable for some reason. It is in the form of a BASIC program made to "look like" a machine language program in that it is loaded into the computer with the `LOADM` command. *Restorit* will scan an entire text file in search of the readable portions. The program is capable of detecting if a file is intact and correctly structured. If a file is determined to be flawed, then a new file is written to disk with the extension `RES`. Portions not readable are marked within the new file. This allows recovery of as much of the original file as possible. Both single- and multiple-drive systems are supported.

The author of *Restorit* realized that many folks will not have an unreadable disk file available, so he provided a special modifier program. I did most of my testing with the *Restorit* program merged with the special program called `RESTOR.TST`, which modifies the main program to report disk errors when none actually exist.

Restorit displays a binary representation of the file in the top half of the screen as it is being restored. The bottom half of the screen contains a status display, such as line numbers and sector numbers of the input file.

I encountered IE and FC Errors while using *Restorit*. These errors came from BASIC and indicate that a few problem areas remain in the program. A bit more attention to error trapping and recovery is probably all that is needed.

The documentation and miscellaneous disk files could use a minor amount of attention. For instance, the `RDOC.DAT` file is a small text file that is almost the same as the printed documentation, yet two different individuals, addresses and phone numbers are supplied in case the user has questions about the product. Also, the BASIC program called `RUNTHIS.BAS` (which prints the `RDOC.DAT` file) should have been four lines in length, yet it had an earlier version of the *Restorit* program appended to it, which increased the apparent size of the program to four grans. These are minor points and are probably indicative of some last minute changes by the program's author.

However, *Restorit* could be a valuable utility for many users. After all, if it saves just one file, it may well be worth its initial cost. The author states that the loss of a file representing three months of work was the reason *Restorit* was written.

(Semmesoft, 10 Strawhat Road, #2A, Owings Mills, MD 21117. $21.95 each: First product review for this company appearing in THE RAINBOW)

— Don Hutchison

Software CoCo 1, 2 & 3

Super Tape/Disk Transfer — Simple and Useful

Super Tape/Disk Transfer is a collection of useful I/O utilities for the CoCo user. It features menu options that provide the following transfers:

Disk To Disk Copy backs up your disk in one to three swaps instead of the usual six to seven. It also works on multiple drive systems.

Disk to Tape Copy archives your disk onto cassette tape. Each disk file is displayed and can be copied to tape or bypassed. ML starting, ending and execution addresses will be displayed.

Tape To Disk Copy reads your favorite programs from tape to disk. Each tape file is read into the computer, and you are given the opportunity to save it to disk or ignore it.

Tape To Disk Copy Automatic Relocate lets you copy all of the files on tape to disk without prompting. It also automatically relocates any ML program with starting addresses between 1536 and 3584 to 3584 in order to avoid conflict with disk memory.

POLYTINT converts your disk-saved CoCo 1 or 2 pictures to CoCo 3 format and gives you a fast, friendly way to recolor them in any 16 colors of your choice. Your new masterpieces will be saved in far less disk space then usual. **See Rainbow Review Oct. 1987.**

Requires CoCo 3, disk drive, RGB monitor preferred.

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Tape To Tape Copy prompts you as it reads each tape file to copy to another tape.

There are a couple of features I liked about this program. The program will not crash if it encounters an I/O Error. Instead it issues an error warning and just restarts. This can be a real help on those tapes or disks that are partially bad. Another special feature is that you can copy DATA files as well.

(Microcom Software, P.O. Box 214, Fairport, NY 14450, 716-223-1477; Disk, $24.95 plus $3 S/H)

— David Gerald

Software

CoCo 3

Gates of Delirium — Fantasy Role Playing

As you enter the dungeon, fear creeps up your spine. You, Orniix the wizard, along with Gazer the Cleric and Sheena the fighter, move stealthily through the myriad passages hoping to find some clue or artifact (or at least a little gold) to help you on your quest. You suddenly come face to face with a band of skeletons. Already weak from past fights, you realize this might be it. As you enter into combat, you know that at least you will go down fighting!

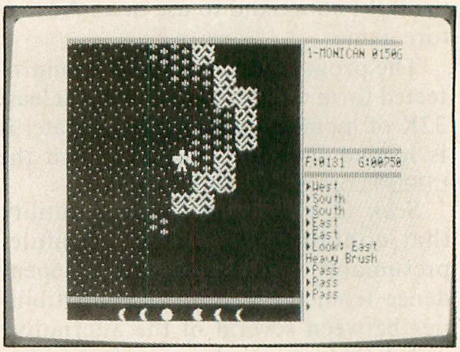
Gates of Delirium, a new graphics adventure/fantasy Simulation by Diecom products is another attempt to mimic fantasy role-playing games on the computer. Yet, this is the closest and best done rendition I have seen for the Color Computer to date. It is basically a conversion of similar games available on other computers, but I believe that Roland Knight, Dave Shewchun and Dave Dies have done the CoCo Community a great favor by producing *Gates*.

The premise of *Gates* is this: You enter the ancient and extensive land of Gates alone, with no knowledge of a purpose, only the need to add other people to your group and survive. In your adventures, you enter cities, castles and dungeons. You attempt to find the mystic lunar gates and transport yourself to a more fruitful land. You will fight skeletons, trolls, thieves, wizards, and many horrible monsters.

The game comes with two disks. The game disk is copy-protected and Diecom will replace it within one year of purchase if anything goes wrong. It is important you make a copy of the player disk (which is not copy-protected) and use it, for the disk is continually updated during play. Also included are 14 pages of documentation, with a page of corrections and additions, and the "Ancient Map of the Land of Gates."

You start the Adventure by generating a character. This is done by choosing a class or profession (such as a fighter or a cleric) and a race (such as human or elven). You then divide up 50 points into four areas: Strength, Dexterity, Intelligence and Wisdom. The more points you put into an attribute, the better you are in that area. For example, a fighter would want to maximize his strength since he specializes in fighting. A thief might want to put extra points into dexterity since his profession relies on quickness and agility (not to mention his ability to swipe chests of gold underneath the noses of the town guards). A cleric or holy man would want high wisdom, and a wizard high intelligence as these attributes affect spell-casting ability. The race you choose sets the limits of how many points you can eventually fit into each category (you must start out with a minimum of 5 in each slot and a maximum of 25). The documentation covering this is fairly well-done, but is poorly typeset, which might possibly confuse the reader. After a little examination, you should be able to divine the correct procedure. One of the little pleasures of this game is that you need go through this task only once. The master program automatically scans the player disk to see if a character has been generated and, if found, starts the game near where the player last left off.

The documentation is intentionally brief. This is to prevent the player from learning too much before starting the Adventure and, thereby, spoiling the fun of discovery. I believe it could have been more complete without risking the fun or mystery of the game. A minor background could have been introduced that would have given the player some purpose, and the text itself could have been greatly expanded. Things such as weapon and armor limitations for class have been incorporated into the game but left out of the directions. This is discouraging when you've just bought a sling for your cleric only to find he can't use it. An experienced role-player could be expected to know these things, but a player with little or no knowledge will have some difficulty.



```
1-MONICAN 0150G

F:0131  G:00750
▸West
▸South
▸South
▸East
▸East
▸Look: East
Heavy Brush
▸Pass
▸Pass
▸Pass
▸
```

The game board itself is a graphics display of the character and his/her companions and their surroundings. The game uses what it terms "shadowing," that is, showing basically only what the character can see, and hiding that which is hidden (usually by mountains or walls). This effect and the animation present in the graphics takes any tedium out of the play. The graphics are a pleasure to watch. The sound effects are complimentary, not competitive (but even these can be turned off). The character and his party always stay in the middle of the graphic display as the countryside scrolls around them. In the upper right-hand corner is a box that shows the members of your group and how healthy they are. The lower right-hand area is taken up by the "dialogue box." It displays the commands entered and any responses and messages.

The game play itself is controlled via approximately 22 one-key commands with other commands that must be typed in. These one-key commands and auto-repeat-on-movement keys make playing relatively easy once the commands are mastered. They consist of the arrow keys for north, south, east and west and other manipulative commands such as Open, Steal and Transact. The typed-in commands must be learned during the course of play.

Combat is handled by switching to a different combat screen that cannot be left unless either you or your opponent is dead. Retreat is not an option. Nor is running from a monster once it has locked onto you. Here, you and your party move around the screen or attack one at a time and, at the end of everyone's turn, the monsters may also move or attack. It progresses in this series until the eventual conclusion. One can learn to predict the movement of the monsters, however, and use that knowledge to help defeat the enemy.

One minor irritation I had with the

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CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing and editing Basic programs. It has block move & copy, program renumbering, automatic line numbers, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

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* Disk file record access for MAIL MERGE & BOILER PLATE printing.
* Completely Automatic Justification, Centering, Flush left and right.
* Change indents, margins, line length, etc. anytime in the text.
* Create and Edit files larger than memory, up to a full disk.
* Easily imbed any number of printer format and control codes.
* Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is an advanced word processing system designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formating problems and letter writing, then TEXTPRO IV is what your looking for. TEXTPRO IV works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often furstrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed. This includes margins, headers, footers, page numbers, page breaks, column formating, justification and Bold, Italic, Underline and Double Width characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128/512K & Disk $89.95

HI-RES III Screen Commander

The display you wanted but didn't get on your CoCo-3.

* 54 Different Character Sizes available 14 to 212 cpl.
* Bold, Italic or Plain character styles.
* Double Width, Double Height and Quad Width characters.
* Scroll Protect from 1 to 23 lines on the screen.
* Mixed Text & Graphics in HSCREEN3 mode.
* PRINT @ available in all character sizes.
* Programmable Automatic Key repeat.
* Full Control Code Keyboard supported.
* Selectable Character & Background color.
* Uses only 4K of Extended or Basic RAM.
* Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example you can't use PRINT @ or have different character sizes on the same screen, even mixing text and graphics with the HPRINT command leaves a lot to be desired. HI-RES III can give you the kind of display capabilities you always dreamed about having on your color computer but didn't get with your COCO-3. Well now it's here and with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. It also overcomes some of the disadvantages found when using the Width 40 & 80 screens. You can use the Print @ function on any line length with HI-RES III. It also gives you a programmable automatic key repeat that can be very handy for editing your Basic programs. Automatic key repeat can be adjusted from ultra fast to super slow and can be disabled entirely if desired. You also get a full control code keyboard using the 'CTRL' key. So many of HI-RES III's extended functions can be controlled directly from the keyboard easily. With just a couple of simple keystrokes you can change character sizes and styles at any time.

Requires 128/512K Tape or Disk $34.95

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game was the fact it locks up if everyone in the party dies (and this tends to happen quite a lot early in your career). This necessitates rebooting the whole game, which gets a little tedious. If you have two drives, it is not as time consuming because you can keep the main disk in Drive 0 and the player disk in Drive 1. This eliminates switching disks all the time.

I have to conclude by restating that *Gates of Delirium*, in my opinion, despite minor problems, is one of the finest and most professional conversions of fantasy role playing games available for the Color Computer. It is exciting, extensive, and pleasing to the eye.

(Diecom Products, 6715 Fifth Line, Ontario, Canada L9T 2X8, 416-878-8358; $38.95 U.S.; $52.95 CDN)

— Glen Dahlgren

Software CoCo 1, 2 & 3

Stock Market Portfolio — Track Your Performance

With all of the interest in the stock market these days, the investor needs a means of keeping track of his investments. Are you making money on your portfolio? Are you keeping track so you can pay Uncle Sam his share of your profits? *Stock Market Portfolio* is a program that can help you in these matters, using the faithful CoCo.

Stock Market Portfolio is designed to keep track of all your current stock holdings and to keep a listing of stocks you have sold by year. It also maintains a tally of your total investment and the amount of profit or loss you have at the moment.

The manual supplied with the program is clear and easy to follow. It contains three major programs: Setup, Current Stock List and Stocks Sold. It also contains sample printouts of the two stock programs.

The Setup program creates the files that will be stored and maintained on the program disk. Several people can create files that will be maintained simultaneously. The program calls for a first and last name for the file, which provides access for future activities. The Setup program also allows for changes in information as required. One of Setup's features is the input of a "Stop Loss Percentage." This is a fixed percent of the cost of a stock that, when subtracted from the cost, represents the selling price you would use to prevent losses on the down side. The program uses this stop loss feature against the original purchase price. I would suggest to the author that it be modified to be a percentage of the current quoted price, which is representative of a realistic situation to protect profits or minimize losses.

The Current Stock List program is designed to be a file of all stocks currently held. The menu asks for such information as Ticker Code, Stock Name, Number of Shares Held, Date Bought, Purchase Price and Current Price. Information can be easily changed, and you can review your entire holdings either on the screen or printer. The current price of stocks in this program can be updated by using the Change Current Stock Price option on the menu. This program also provides a summation of the entire portfolio showing the total cost, current value, profit or loss total, and percentage of profit or loss. When a stock is sold, it can be transferred to the Stocks Sold program. The program accomplishes this transfer when you change the status from B (bought) to S (sold). The capacity of this program appears to be very large, certainly more than a typical investor may have in his portfolio.

The Stocks Sold program maintains files on stocks that have been sold by year of sale. This is particularly useful at income tax time, because it provides all the information required for your IRS return by year. Again, you can change information if necessary and can review the entire file on the screen or printer. This program also provides a summation of total portfolio cost, total sale price and total profit or loss in dollars and percent. You should note that to obtain true profit or loss, the actual price per share, including broker commissions, should be used.

The program also handles dividends by requesting the annual dividend by year, showing the dividend as a percent of purchase price, and showing the total dividend per year for the number of shares held. This is useful in reporting dividend earnings to the IRS by year.

I would not hesitate to recommend *Stock Market Portfolio* to any serious stock market investor or to amateurs who want to follow the market on paper. The program is easy to use, and it provides a good picture of your current portfolio and your transaction history by the year.

(Paparis Enterprises, Inc., 700 York Street, Williamsburg, VA 23185; $22 plus $3 S/H: First product review for this company appearing in THE RAINBOW)

— Mel Siegel

Software CoCo 3

TW-80 — A CoCo 3 *Telewriter-64* Enhancer

I don't often get a chance to review software that really gets me fired up, but that's just what happened when I opened the package containing a new program from Doug Masten. I have written many reviews using *TW-64* and its various enhancements which made it a delight to use on the CoCo 1 and 2. Now I have the pleasure of reviewing an enhancement for the CoCo 3.

Besides a Color Computer 3 with at least 128K of RAM, this enhancement requires one disk drive and an unmodified version of *TW-64*. If you have 512K, you will also be able to utilize the built-in RAM Disk feature.

After you have backed up your new *TW-80* disk, you're all set to install the software. This is very easy to do, and the six-page instruction booklet explains each step. The documentation also explains how to use the new features of the program. When this is all done, *TW-64* with the *TW-80* enhancement is booted up using the familiar `LOADM"T"` `ENTER`, but that is where the similarity ends. *TW-80* is written specifically for the CoCo 3, and the new features are truly outstanding.

The first thing you'll notice is a clean, uncluttered main menu.

All of the options work the same as on the previous versions, but there are some differences. One of the most obvious is a reverse video (black on white) status line at the bottom of the screen. This line shows you at a glance the current cursor position as a line and column number. Insert or overstrike modes are displayed and can be toggled using the CTRL-0 key. Also indicated is whether or not Wordwrap is on or off and the name of the file you are reading. Memory available for text is displayed and counts down as you type. On my 512K CoCo 3, this number was 45056, or just over 45K of text space available in an empty buffer. The program defaults to 80-characters per line with white letters on a jet-black background. The filename is displayed in the status line.

A program called `CONFIG.BAS` is included on the disk and lets you change all of the default parameters in the program such as screen and text color, key click and repeat rate, disk drive stepping rate, and printer format.

The displayed text with true lowercase letters with descenders is very easy to read on my CM-8 RGB monitor. Six available screen fonts are included on the disk, but changing them is somewhat of a pain in the neck; so once you choose your favorite, you won't want to change often. Because each font is unique in style and image quality, I ended up making a *TW-80* disk for each one. Now all I have to do is load in the *TW-80* disk with the particular font style I'm in the mood for. I was delighted with all the fonts. They are a big improvement over the 80-column text contained in CoCo 3's ROM. I can clearly see all three top points in the lowercase 'w'.

The added CoCo 3 CONTROL and ALT keys are also supported. The ALT key used with four other characters yields left and right brackets and braces. Visible carriage returns are also available and are a big help when setting up columns.

The Disk I/O menu is clean and neat looking and contains the two columns of commands. The most noticeable change in these commands is evident when selecting Read, Append, Name Change or Kill. In those cases, all of the file names on the disk appear on the screen, and the up or down arrow keys are used with a highlighted cursor to select the file name. And like earlier *TW-64* enhancements, the Disk I/O is in memory; there is no delay in accessing Disk I/O. I especially liked the use of the F1 and F2 keys. Switching from the text screen to the main menu and back is a snap. Also added to the Disk I/O menu is Format. How many times have you tried to save a *TW-64* file only to find out the disk was full? You either had to kill something else on the disk or exit to BASIC to format a disk. Now you can format a disk without losing your text. And much to my delight, you can go directly to the Disk I/O menu from the text screen without going to the main menu first.

Another nice touch that has been added is an automatic file backup. The new disk driver for *TW-80* checks before saving a file to disk to see if there is already a file under the same name. If there is, it renames that file with an extension of `BAK` (Backup). If there is also a file with the same name and `BAK` extension, then *TW-80* kills the original `BAK` file, renames the existing `TXT` file to `BAK`, and saves the current file with a `TXT` extension. And to top it all off, if you are using a 512K CoCo 3, the extra memory can be used for two RAM Disks. You'll find this instant disk access a pleasure to use, but be sure to save your work to a floppy disk before you quit *TW-80*; otherwise, you will lose your work.

The Format menu has the same commands as earlier versions except an Abort Printing command has been added. Again, the menu is clean, orderly, and it also incorporates the F1 and F2 keys to get back quickly to either the main menu or the text screen.

About the only negative point I can make is that some mention needs to be made in the documentation of printer baud rate settings. The `CONFIG.BAS` program shows a default of 7 for 9600 baud, but my old version of *TW-64* uses a 1 for 9600 baud. I think a table or other explanation would be helpful for those using different types and speeds of printers.

As you can see, I'm excited about *TW-80*. This is a fine piece of software for the CoCo 3, and I highly recommend it.

(Spectrum Projects Inc, P.O. Box 264, Howard Beach, NY 11414, 718-835-1344; $39.95 plus $3 S/H)

— Jerry Semones

Software CoCo 1, 2 & 3 OS-9

Screen Star/OS-9 Text Formatter — Word Processing Made Easy

Screen Star is billed as a *WordStar* clone. *WordStar* is a popular MS-DOS word processor that has been around for quite a while. Although it is a difficult piece of software to learn, it is considered by many to be one of the best. The advantage of using a *WordStar* clone on the CoCo is that you can work comfortably on both the MS-DOS and OS-9 systems without having to relearn commands. I have not used *WordStar*, but my *Dynastar* experience made learning *Screen Star* quite easy since the commands are very similar.

One difference between the *WordStar* clones and most RS-DOS word

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processors such as *Telewriter* is that word processing is done in two stages with two different programs. *Screen Star* is described as a text editor, which is used for entering and editing text. In order to obtain the printed hard copy, a second program, *OS-9 Text Formatter*, is used. While the two packages are sold separately, they are usually purchased together, especially when setting up a word processor.

The *Screen Star* package comes with two versions — OS-9 Level I and Level II. Also included is a spelling checker with dictionary. The disk contains a Level I OS-9 boot and a limited number of OS-9 commands for Level I operation of *Screen Star*. This version has its own 50-character screen, similar to other RS-DOS word processors. The screen scrolls horizontally so you can see the whole text, and the scrolling is very crisp. However, it is no substitute for an 80-column screen.

I tried running *Screen Star* with my 80-column driver under Level I, Version 2, but was unsuccessful since *Screen Star* looks for its own screen driver. I would like to see Computerware change this, as there are many Level I users who have 80-column screen capability. It is important to note that those of you who do not own OS-9 can still have a good word processor without a major expenditure. Hopefully, you will like OS-9 and purchase the operating system at a later date.

The Level II version does not come with a Level II boot and commands. Those who want to use this version will have to purchase OS-9 Level II separately from Tandy. Also, a 512K CoCo is required for the Level II version. This version provides the extra options to directly call the text formatter and the spelling checker from within *Screen Star*.

Starting up *Screen Star* is easy. For OS-9 Level I, simply make a backup of the master disk and, using the backup disk, type `DOS` after powering up your CoCo. OS-9 will prompt you for the date, and at the OS-9 prompt enter `SSTAR`. For Level II you will have to copy the Level II version of *Screen Star* to `/d0/CMDS` of your system disk. Also, make sure you are in an 80-by-24 text screen before starting *Screen Star*. You will also want to set up the colors in the palette to your liking if you are using a color monitor.

Although *Screen Star* is a *WordStar* clone, Computerware has done some simplification of cursor movement, which has always been a "pain" for new users of *WordStar*. Cursor motion on the screen is controlled by the arrow keys, as we have come to expect. For seasoned users of *WordStar*, *Screen Star* also retains the original cursor motion control.

Before going further in the discussion of *Screen Star* commands, I will talk a little about the online help facility, which can be eliminated once you are proficient in *Screen Star*'s commands. This option is available in both versions. *Screen Star* comes configured with the online help activated. If you enter the appropriate help command, a window will open that gives information on the four categories of *Screen Star* commands.

> ***"In the Level II version, capability is provided for setting up 10 function keys that make* Screen Star *operations easier."***

The basic command set (ALT-I) takes care of the most commonly used commands for cursor movement, insertion and deletion. The CTRL-K commands (Block and Disk I/O) handle the disk I/O and the block text copying, moving, inserting, deleting and saving/loading of files to disk. The CTRL-P commands (Parameter Features) are used to set up tabs, line length, word wrap and several other features. These parameters can be saved in a parameter file that is read by *Screen Star* on startup. The CTRL-Q commands (Quick Key Sequences) are used for rapid horizontal and vertical motion as well as jumping to the beginning or end of the document. The CTRL-Q commands also cover the search and replace options.

In the Level II version, capability is provided for setting up 10 function keys that make *Screen Star* operations easier. The definitions for each key can be saved in a parameter file along with line length, tabs and other parameters so that everything is ready to roll each time that you run *Screen Star*. The function keys are used by pressing the combination of ALT plus a number from 0 to 9.

The evaluation was done using the Level II version of *Screen Star*. Overall, it is a good introductory word processor with quite a bit of power. However, I found two problems with *Screen Star* — speed and lack of screen formatting. I never lost any characters, but I found that text insertion was very slow, as was block movement of paragraphs.

Screen Star provides a very nice feature when doing block moves, copies or deletions. After marking the start and end of the block, the block is reprinted in inverse video so you can see exactly what has been marked. While this is a handy feature, it is slow, since a complete screen refresh occurs to the point of a block. The printing of the block in inverse video is extremely slow and almost negates the value of this feature.

A bit of caution is also in order here. I found that marking a part of a line with the block commands resulted in the loss of the entire line when I did a block delete. This is unusual since block deletion works on parts of lines on every word processor that I have used and is quite useful. The only way around this problem is to use the word delete command, CTRL-T. One positions the cursor at the start of the deletion and presses CTRL-T to delete words to the right. There was no provision for a left word delete.

The use of windows for help menus is also slow. I don't believe that this is due to the OS-9 system, as I have seen faster window operation using BASIC09. In any case, the windows are nicely set up and provide valuable information for the new user. I did run into several situations where the text under a window was not restored after the window was closed. At first, I thought I had lost several lines of text; however, moving the cursor to the appropriate lines somehow restored the text. This is obviously a non-destructive bug, but it's quite disheartening to see lines of text vanish.

As I said in the beginning of this review, the philosophy of *WordStar* clones is to let one program do the editing and another do the formatting. *Screen Star* does exactly this — there is no screen formatting. Everything is left to the text formatter.

One of the major advantages of OS-9 is the hierarchical directory system. For example, on my document disk I have a directory for RAINBOW reviews, `/d1/RAINBOW_REVIEWS`. Unless you remember to do a change directory before starting *Screen Star*, there is no way to change directories from within it. I found out the hard way by calling a shell with CTRL-PO and trying to do a `chd`. The net result was I hung up the CoCo and could not get back into *Screen Star*. The bottom line is doing the `chd` before starting *Screen Star*; hopefully, Computerware will add this option (which is virtually a standard on any OS-9 software).

I mentioned earlier when talking about the function keys that *Screen Star* sets up a parameter file that is read on start-up. Thus, you are able to set various parameters and customize *Screen Star* to your liking. One parameter is tab spacing. *Screen Star* comes with a default setting of tabs every 16 spaces. This can be changed to whatever spacing you like, but only equally spaced tabs can be set, such as every five spaces.

The documentation provided consists of a 23-page manual, which provides all the necessary information to run *Screen Star*. The manual provides a discussion of all of the commands and a command summary at the end of the manual. In addition, a help card is provided. Since I had experience with the *WordStar* command approach, I had no problem using *Screen Star*. For the beginner, I think that it would be appropriate for Computerware to provide a tutorial illustrating *Screen Star* operation. Otherwise, the manual is easy to use as a reference of command information.

Included on the *Screen Star* disk is a spelling checker program called *Smart Speller* (*Spell*), along with a 25,000-word dictionary and a dictionary editor. The approach taken in *Smart Speller* is different from most spelling checkers. The dictionary contains misspellings of the most common words used in a typical document. Instead of scanning through a large dictionary of proper spellings, *Spell* looks in a small file of misspellings. This is presumably a faster approach than the more traditional versions and takes about 80 seconds per page of text. Of course, if you are like me and type non-standard misspellings, *Spell* will miss the error. This is the price you pay for speed.

Spell can be run either directly from the OS-9 command line or, if using the Level II version of *Screen Star*, by entering the command CTRL-KZ. For no specific reason, I prefer to run *Spell* from the command line where the two options are D, display all misspellings and the correct spelling; and P, the prompted mode that displays each misspelling and prompts if you would like to replace the misspelled word with its correct spelling. The latter option is to be preferred since there are always some words that are correct but a spelling checker might change. Of course, with this option you must remain at the computer in order to tell *Spell* whether it should replace each word that it finds with the correct word from the dictionary.

Also provided with the *Smart Speller* is a dictionary editor, *Edict*, which will allow you to add or delete words within the limit of 25,000 words. This is a menu-driven program that provides easy editing of the dictionary.

> **"Text *provides a wealth of commands to meet almost any printing situation."***

I ran *Spell* several times during the time spent with the *Screen Star* package and found no problems. It works especially nice if you have a two-disk system since you can place the new copy on the second drive.

Now that you have entered and edited a text file with *Screen Star* and checked the spelling with *Spell*, it is time to print the file. You will recall in the beginning of this review, I mentioned that *WordStar* and its clones consist of two programs, the screen editor and the text formatter. This approach is quite different from that of most RS-DOS word processors, in which the setup for the printed page is done within the word processor, usually from a menu. In the *WordStar* approach, text formatting commands are embedded in the text file using the screen editor.

Text formatting commands, often refered to as dot commands, consist of a period followed by two letters that identify the command function. Each command must be placed at the beginning of a line; otherwise, *Text* will print the line as part of the text. A number of the commands have arguments that are entered on the same line following the command. For example, the command `.SP` causes one blank line to print whereas `.SP 3` causes three lines to print. *Text* provides a wealth of commands to meet almost any printing situation.

Besides commands for text formatting, there are commands for setting up the printer, inserting data or text from other files such as mail merge files, stopping the printer to directly enter text from the keyboard, and macro capability. This last capability is very important since it allows the user to create specific sets of instructions for special formats. A very good example, which is provided in the documentation, is a macro for creating footnotes at the bottom of a page. Anyone who has ever typed a term paper knows quite well the problem of allowing enough space at the bottom of the page to type the footnotes. With the footnote macro, all you have to do is type `.BF` when you enter the foootnote reference in the text. This command is then followed by the actual reference citation. When *Text* begins processing the file to the printer, it will save all references encountered and print them at the bottom of the next page. In this way you let the computer take care of calculating needed space for footnotes.

There is a lot of powerful capability that will meet almost any type of page formatting. It will take time to learn all the options as well as the interactions of all of the commands; however, the effort will be well worth it. For those who plan to do simple word processing such as letters and documents, you will only need a few commands such as the margins, line spacing and perhaps some printer format commands. Also, many of the commands have defaults that meet most conditions. This review used only the centering command and relied on the default settings.

Overall, the combined package of *Screen Star*, *Spell* and *OS-9 Text Formatter* makes a very good word processing package. The price for the combined package is reasonable, especially considering the capability provided. I do have reservations about the *Screen Star* editor with regard to speed. Since I use a word processor almost on a daily basis, with a lot of formatting that I want to see onscreen as opposed to the printed page, I would rate the editor as fair. The user should always take into consideration such factors as cost, expected usage and any special needs before buying any word processor. However, no matter what your likes or dislikes, this package provides the capability to meet all home computer needs.

(Computerware, 4403 Manchester Ave., Suite 102-Box 668, Encinitas, CA 92024, 619-436-3512; *Screen Star*, $49.95; *OS-9 Text Formatter*, $34.95; both $74.95)

— Donald Dollberg

Received and Certified

The following products have recently been received by THE RAINBOW, *examined by our magazine staff and issued the* Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

Assembly Language Programming for the CoCo 3, a book that describes the CoCo 3 enhancements and how to use them with assembly language. This is a continuation of the book *Assembly Language Programming for the TRS-80 Color Computer. Tepco, 30 Water Street, Portsmouth, RI 02871, (401) 683-5312; $12 plus $1 S/H.*

Color Max 3, a 128K graphics editor that allows use of 16 colors in 320-by-200 resolution. Features icons, pull-down menus and dialog boxes. For the CoCo 3. *Computize, Inc., P.O. Box 207, Langhorne, PA 19047, (215) 946-7260; $59.95.*

DeskMate 3, an integrated package of seven personal productivity applications: Text, Ledger, Index Cards, Paint, Telcom, Calendar and Calculator. Text, Ledger and Telcom permit the use of either 40 or 80 columns. For the CoCo 3. *Tandy Corporation, 1700 One Tandy Center, Ft. Worth, TX 76125; $99.95. Available in Radio Shack stores nationwide.*

◆ **GrafFind**, a disk utility that lets you view, transfer, rename, and kill standard graphics files. For the CoCo 1, 2 and 3. *RainyDay Software, 10625 SE 362nd, Sp. B-32, Boring, OR 97009, 503-663-7160; $10.*

Iron Cross: War in Russia, a 64K war game for the armchair general. The German invasion of Russia began on June 22, 1941. The object of this program is to defeat the Russian forces controlled by the computer to take control of the Russian cities. For the CoCo 1, 2 and 3. *Computerware, Inc., 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024, (619) 436-3512; $24.95.*

Mickey's Space Adventure, a 64K Adventure game for ages 8 and up. Join Mickey and Pluto on a journey through the solar system in their quest to help friendly aliens recover lost pieces of a valuable memory crystal. For the CoCo 1, 2 and 3. *Sierra On-Line, Coarsegold, CA; $34.95. Available in Radio Shack stores nationwide.*

MLBASIC Revision 2.0, a 128K enhanced BASIC compiler that allows users who are unfamiliar with machine language programs to create a machine language program from a BASIC program with little or no effort. For the CoCo 3. *WasatchWare, 7350 Nutree Drive, Salt Lake City, UT 84121, (801) 943-6263; $69.95 CoCo 2, $49.95 CoCo 3 plus $4 S/H.*

PYRAMIX, a 128K arcade game. The object is to hop Kubix — a short, roundish little guy with a long snout — on the tops of the blocks that make up the pyramid. Your goal is to change all the blocks in the pyramid to the same color and move on to a higher level of play. For the CoCo 3. *Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228, (502) 966-8281; $24.95.*

Robot Odyssey 1, a 64K educational program that helps develop skills in logical problem-solving, abstract reasoning and creative thinking. Design robots, navigate invisible mazes, solve puzzles, and sneak past sentries to unlock the secret exit from Robotropolis. For the CoCo 1, 2 and 3. *The Learning Company, 545 Middlefield Road, Menlo Park, CA 94025, (800) 852-2255; $34.95. Available in Radio Shack stores nationwide.*

TW-80, an 80-column enhancement for *Telewriter-64* with *Telepatch* using the F1 and F2 keys to access the main menu or editor. Includes new fonts and print spooler. For the CoCo 3. *Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414, (718) 835-1344; $39.95 plus $3 S/H.*

◆ **First product received from this company**

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

Reviewing Reviews

WRITEST

Editor:

I would like to update the information on my program *WRITEST* as reviewed by Mel Siegel (January 1987). As a result of his comments, the program has been condensed twice, for a gain of about 5K, so it now handles a `CLEAR4500` rather than the `1500` for Version 1.0.

The edit feature has been reworked twice and is being touched up a bit more. It is very similar to the `EDIT` in the CoCo's Extended BASIC, but slower, due to the use of BASIC programming.

Filing now includes an append feature so two files from the same section can be combined. For those with non-Radio Shack recorders, `MOTORON` and `MOTOROFF` can be controlled from the file menu.

Auto-wordwrap no longer wipes out following lines, but appends them. Line spacing can be set and changed within the "line processor."

For those with a memory problem, a split version of the program is sent direct (disk and tape). The program is available on disk (RS-DOS or JDOS) with cassette filing for merge. The program is now available for Tandy DMP-130 and similar printers, for the Star Gemini 10 and similar printers, as well as for the original Epson Graftrax.

I will continue to send the program at my duplication and mailing costs ($3) and rely on the buyer to be conscientious enough to subsequently send me fair value for what it is worth to him/her.

Darryl L. Petrak
House, NM

Backup and *Backup III*

Editor:

In your review of *Backup* and *Backup III* (July 1987), Dale Shell stated that he would like to be able to use the utilities on multiple drive systems. The programs were intended primarily for single-drive users but can be modified for two drives with the following patches:

Backup:

```
10 CLEAR1000: DSKI$0,16,1,
   A$,B$: DSKI$0,16,2,C$,
   D$:MID$(B$,94,1)=CHR$
   (33):MID$(B$,116,1)=CHR$
   (1):MID$(C$,67,1)=CHR$
   (33):MID$(D$,75,1)=CHR$
   (1):DSKO$0,16,1,A$,B$: DSKO
   $0,16,2,C$,D$
```

Backup III:

```
10 CLEAR1000: DSKI$0,16,1,
   A$,B$: DSKI$0,16,2,C$,
   D$:MID$(B$,123,1)=CHR$
   (33):MID$(C$,30,1)=CHR$
   (1):MID$(C$,118,1)=CHR$
   (33):MID$(D$,126,1)=CHR$
   (1):DSKO$0,16,1,A$,B$: DSKO
   $0,16,2,C$,D$
```

Enter the proper patch and run it with a backup copy of your utility in Drive 0. (Don't use it on the original — a typing mistake will destroy the program!) The patches change the destination drive to Drive 1.

Carl England
Brainchild Software
Calhoun, GA

Telewriter 64

Editor:

In the August 1987 issue of RAINBOW is a review of *Telewriter 64.* It states that *TW-64* "defaults to the Insert mode rather than to the Overstrike mode . . . besides, you can select the overstrike mode, if you prefer, with a simple keystroke."

I have searched through the instruction manual and can find no reference to Overstrike mode nor a simple keystroke.

I would appreciate your telling me how to initiate an Overstrike mode for making corrections in text.

Ralph C. McCormic
Keno, OR

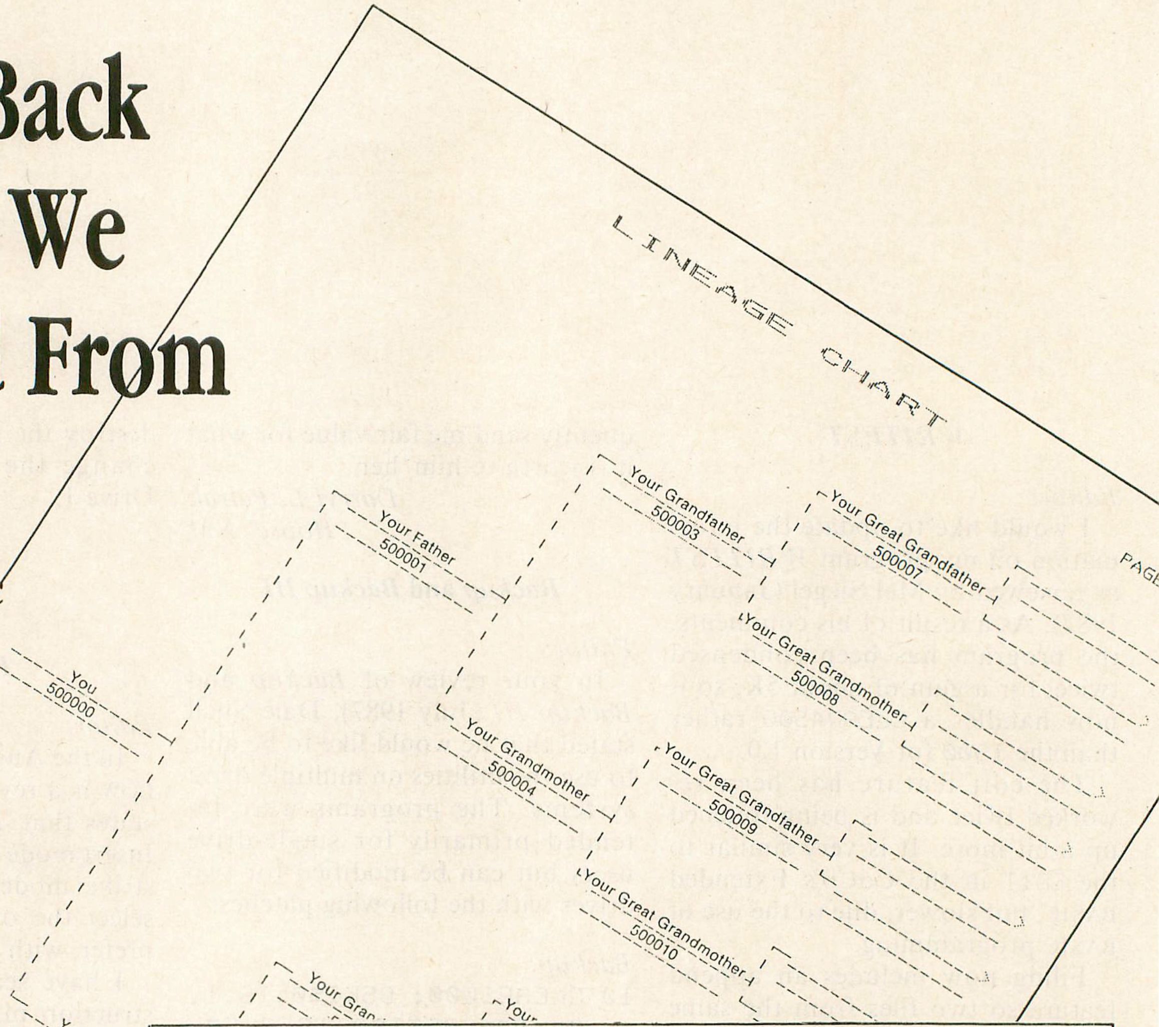
Editor's Note: You are quite correct in your observation concerning the Insert mode (TW-64). *The review was supposed to point out that* Telepatch *or* Ultra Telepatch *defaults to the Insert mode. In these programs you simply press* CLEAR-O *for overstrike.*

We're sorry for the inconvenience this may have caused you and appreciate your calling this error to our attention.

Right Back Where We Started From

Part II

By Brian LeBlanc


LINEAGE CHART
PAGE
You
500000
Your Father
500001
Your Mother
500002
Your Grandfather
500003
Your Grandmother
500004
Your Great Grandfather
500007
Your Great Grandmother
500008
Your Great Grandfather
500009
Your Great Grandmother
500010
Your Gran
Your

Last month, we presented the first part of the *Genealogy* program — the part that generates family information sheets. Now that you have gathered data from your family members, it's time to enter that information into the computer and generate a lineage printout.

Load the `FAMILY` program and insert a newly formatted data disk. `FAMILY` creates two files on this disk. The first file, `NAMES`, contains the first eight entries on a family history information page, plus the data location on the `DATA` file. The second file, `DATA`, holds a complete record for each family member.

After 50 records have been entered, the program will prompt for a new data disk. Disregarding this notice could cause a system crash, and some or all of the data on the disk could be lost.

Entering Data

When entering data, try having the family members information close at hand to avoid undue errors. If a `DATA` line has more than 28 characters, the excess will be cut off. The first three entries on the first page (i.e., last name, first name, middle name) *must* contain names or, if the names are not known, a letter must be inserted for the program to continue.

The lineage number can be any number from 1 to 99,999,999. (See the lineage chart for possible uses.) The

---

Brian LeBlanc is a licensed industrial electrician and a qualified electronics technician. He troubleshoots and repairs industrial computers and programmable controllers. Brian holds eight diplomas from various computer courses, and he lives in Digby County, Nova Scotia.

generation, baptized date, birth date and death date can be any number from 1 to 99,999,999. The above notes will only accept numbers.

When entering dates, it is imperative that they are entered as year, month, day; they do not contain any spaces or commas, and they contain eight digits. As an example, January 5, 1987, would be `19870105`.

When all the data has been entered, you can skip to the end of the routine by pressing L for Last Entry. You then have two choices: aborting (press M to abort and return to the menu), which will erase all entered data; or saving data (press S to save on disk), which will ask if the proper disk is in the drive (the proper disk being any initialized disk).

After the data has been saved on disk, you can either press E to enter more data or press M to return to the menu.

Searching Data

Trying to search an empty disk will cause an error and prompt you to return to the menu. The program will search for a full name or part of a name. As an example, entering P for Last Name will display all last names beginning with P.

You can search for a specific birth date: all birth dates up to and after a specific date, and those between two specific dates. You can also search for a specific death date: all death dates up to and after a specific date, and those between two specific dates. The screen will show how many matches were found in the file.

When displaying a searched record, press the space bar to display the next page. When changing a searched record, press the space bar. Display the next page. Pressing C will put the cursor on the top of the page, pressing the down arrow will lower the cursor one line at a time, and pressing the left arrow or right arrow will erase the current `DATA` line and put the cursor at the beginning of the line.

After the data has been entered, pressing ENTER will place the cursor at the left of the page. To continue down the page, press the down arrow key. When the cursor reaches the bottom of the page, the next page will be displayed.

For example, to change the birth date of John Doe:

1) Call up the Search routine.
2) Enter `DOE` for the last name.
3) Enter `JOHN` for the first name.
4) Press ENTER until the cursor reaches the bottom of the page.
5) Press S to begin the Search.
6) Press 1 (display record) to verify that the correct record has been found.
7) Press the space bar until the menu is displayed.
8) Press 5 (change record).
9) Press C to begin the data Change routine.
10) Press the down arrow until the cursor is opposite the birth date.
11) Press the left arrow or right arrow to put the cursor on the old data.
12) Enter the correct data and press ENTER.
13) Press the down arrow until the cursor reaches the bottom of the page.
14) When the next page is displayed, press the space bar to scroll pages.
15) At the Screen prompt, press S to save the data on disk.

Printouts of Records

Pressing 2 (printout complete record) will ask you to make sure the top of the printer paper is flush with the tractor feed cover. Pressing P will cause the printer to scroll through one page and begin printing the record on the second page. And, pressing 3 (printout partial record) will print the first page only.

Record printouts consist of two pages. Page 1 contains the first three screen pages and Page 2 contains the remaining two screen pages.

The printer I used is the Tandy DMP-105. You may have to adjust lines 1730 and 4230 for your printer to adjust the start position of printing on the paper.

(Questions about this program may be directed to the author at RR1 Church Point Box 67-B, Digby County, Nova Scotia, Canada B0W 1M0. Please enclose an SASE when writing for a reply.). ☐

260	206	2750	182	4900	96
510	170	2900	62	5100	190
770	223	3030	85	5340	175
1010	161	3220	57	5550	77
1240	250	3430	207	5760	133
1450	182	3680	175	5890	115
1670	68	3860	187	6150	210
1910	98	4050	134	6280	154
2180	187	4200	140	6560	210
2400	152	4440	77	END	255
2560	160	4660	103		

Listing 1: `FAMILY`

```
100 CLEAR 1950
110 ON ERR GOTO 6670
120 DIM A$(137),B$(125),H(50),N$
(50),S$(16):WIDTH 40
130 DUMMY$="
                "
140 REM LOGO
150 HSCREEN 1:PALETTE CMP:PALETT
E 0,0
160 HPRINT (6,2),"**************
************"
170 HPRINT (6,3),"*
              *"
180 HPRINT (6,4),"*  F A M I L Y
  T R E E   *"
190 HPRINT (6,5),"*
              *"
200 HPRINT (6,6),"*     P R O G
R A M        *"
210 HPRINT (6,7),"*
              *"
220 HPRINT (6,8),"**************
************"
230 HPRINT (9,10)," (C)  BRIAN L
EBLANC"
240 HPRINT (4,16),"FOR COCO 3 /D
ISK DRIVE/PRINTER"
250 HPRINT (9,18)," JANUARY 24/1
987"
```

```
260 FOR I=1 TO 1200:NEXT I
270 GOSUB 6090
280 PALETTE CMP:HSCREEN 0:CLS
290 REM MENU ROUTINE
300 CLS
310 LOCATE 18,1:PRINT "MENU"
320 FOR I=125 TO 129
330 LOCATE 8,I-120:PRINT A$(I)
340 NEXT I
350 LOCATE 5,20:PRINT "YOUR CHOI
CE : ?"
360 Q$=INKEY$: IF Q$="" THEN 360
370 IF Q$<"0" OR Q$>"3" THEN 360
380 ON VAL(Q$) GOTO 410,2320,231
0
390 STOP
400 REM DISPLAY FAMILY HISTORY I
NFORMATION PAGE
410 CLS
420 R=1:C=1
430 FOR I=1 TO 16
440 LOCATE C,R:PRINT A$(I)+B$(I)
450 R=R+1
460 NEXT I
470 R=1:C=12
480 FOR I=1 TO 3
490 LOCATE C,R:LINE INPUT Q$
```

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```
500 IF Q$<"A" OR Q$>"Z" THEN 490
510 IF LEN(Q$)>15 THEN Q$=LEFT$(
Q$,15)
520 IF LEN(Q$)<15 THEN Q$=Q$+" "
: GOTO 520
530 B$(I)=Q$
540 R=R+1
550 NEXT I
560 FOR I=4 TO 8
570 LOCATE C,R:LINE INPUT Q$
580 IF LEN(Q$)<8 THEN Q$=Q$+" ":
GOTO 580
590 B$(I)=Q$
600 R=R+1
610 NEXT I
620 R=9
630 FOR I=9 TO 16
640 LOCATE C,R:LINE INPUT Q$
650 IF LEN(Q$)>28 THEN Q$=LEFT$(
Q$,28)
660 B$(I)=Q$
670 R=R+1
680 NEXT I
690 CLS
700 LOCATE 1,10:PRINT"PRESS (C)
FOR PERSONAL NOTES PAGE"
710 LOCATE 1,12:PRINT"       (L)
FOR LAST ENTRY"
720 Q$=INKEY$:IF Q$="" THEN 720
730 IF Q$="L" THEN 1560
740 IF Q$<>"C" THEN 700
750 REM DISPLAY PERSONAL NOTES P
AGE
760 CLS
770 R=1:C=1
780 FOR I=17 TO 35
790 LOCATE C,R:PRINT A$(I);B$(I)
800 R=R+1
810 NEXT I
820 R=1:C=12
830 FOR I=17 TO 35
840 LOCATE C,R:LINE INPUT Q$
850 IF LEN(Q$)>28 THEN Q$=LEFT$(
Q$,28)
860 B$(I)=Q$
870 R=R+1
880 NEXT I
890 CLS
900 LOCATE 1,10:PRINT "PRESS (C)
 FOR FIRST MARRIAGE PAGE"
910 LOCATE 1,12:PRINT "      (L)
 FOR LAST ENTRY"
920 Q$=INKEY$:IF Q$="" THEN 920
930 IF Q$="L" THEN 1560
940 IF Q$<>"C" THEN 900
950 REM DISPLAY PERSONAL FAMILY,
FIRST MARRIAGE PAGE
960 CLS
```

```
970 R=0:C=1
980 FOR I=36 TO 58
990 LOCATE C,R:PRINT A$(I);B$(I)
1000 R=R+1
1010 NEXT I
1020 R=0:C=12
1030 FOR I=36 TO 58
1040 LOCATE C,R:LINE INPUT Q$
1050 IF LEN(Q$)>28 THEN Q$=LEFT$
(Q$,28)
1060 B$(I)=Q$
1070 R=R+1
1080 IF I=40 THEN I=I+1:R=R+1:C=
1
1090 IF I=49 THEN I=I+1:R=R+1:C=
1
1100 NEXT I
1110 CLS
1120 LOCATE 1,10:PRINT "PRESS (C
) FOR SECOND MARRIAGE PAGE"
1130 LOCATE 1,12:PRINT "        (L
) FOR LAST ENTRY"
1140 Q$=INKEY$:IF Q$="" THEN 114
0
1150 IF Q$="L" THEN 1560
1160 IF Q$<>"C" THEN 1120
1170 REM DISPLAY PERSONAL FAMILY
,SECOND MARRIAGE PAGE
1180 CLS
1190 R=0:C=1
1200 FOR I=59 TO 81
1210 LOCATE C,R:PRINT A$(I);B$(I
)
1220 R=R+1
1230 NEXT I
1240 R=0:C=12
1250 FOR I=59 TO 81
1260 LOCATE C,R:LINE INPUT Q$
1270 IF LEN(Q$)>28 THEN Q$=LEFT$
(Q$,28)
1280 B$(I)=Q$
1290 R=R+1
1300 IF I=63 THEN I=I+1:R=R+1:C=
1
1310 IF I=72 THEN I=I+1:R=R+1:C=
1
1320 NEXT I
1330 CLS
1340 LOCATE 1,10:PRINT "PRESS (C
) FOR THIRD MARRIAGE PAGE"
1350 LOCATE 1,12:PRINT "        (L
) FOR LAST ENTRY"
1360 Q$=INKEY$:IF Q$="" THEN 136
0
1370 IF Q$="L" THEN 1560
1380 IF Q$<>"C" THEN 1340
```

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```
1390 REM DISPLAY PERSONAL FAMILY
,THIRD MARRIAGE PAGE
1400 CLS
1410 R=0:C=1
1420 FOR I=82 TO 104
1430 LOCATE C,R:PRINT A$(I);B$(I
)
1440 R=R+1
1450 NEXT I
1460 R=0:C=12
1470 FOR I=82 TO 104
1480 LOCATE C,R:LINE INPUT Q$
1490 IF LEN(Q$)>28 THEN Q$=LEFT$
(Q$,28)
1500 B$(I)=Q$
1510 R=R+1
1520 IF I=86 THEN I=I+1:R=R+1:C=
1
1530 IF I=95 THEN I=I+1:R=R+1:C=
1
1540 NEXT I
1550 REM DISK SAVING ROUTINE
1560 CLS
1570 LOCATE 1,8:PRINT "PRESS (S)
 TO SAVE TO DISK"
1580 LOCATE 1,10:PRINT "PRESS (M
) TO ABORT AND RETURN TO MENU"
1590 Q$=INKEY$:IF Q$="" THEN 159
0
1600 IF Q$="M" THEN FOR I=1 TO 1
04:B$(I)="":NEXT I:GOTO 2300
1610 IF Q$<>"S" THEN 1590
1620 REM PROPER DISK CHECK
1630 CLS
1640 LOCATE 1,8:PRINT "ENSURE PR
OPER DATA DISK IS IN DRIVE"
1650 LOCATE 1,10:PRINT "PRESS (C
) TO CONTINUE"
1660 Q$=INKEY$:IF Q$="" THEN 166
0
1670 IF Q$<>"C" THEN 1660
1680 OPEN "D",#2,"DATA",32
1690 IF LOF(2)=0 THEN 1740
1700 GET #2,1
1710 INPUT #2,Q$
1720 LET LASTREC=VAL(Q$)
1730 GOTO 1780
1740 Q$=STR$(1)
1750 WRITE #2,Q$
1760 PUT #2,1
1770 LASTREC=VAL(Q$)
1780 CLOSE #2
1790 LASTREC=LASTREC+1
1800 STARTREC=LASTREC
1810 REM OPEN DATA FILE AND DUMP
 ENTRY ARRAY
1820 OPEN "D",#2,"DATA",32
1830 RECORD=STARTREC
1840 FOR I=1 TO 104
1850 IF I>8 THEN IF LEN(B$(I))=0
 THEN B$(I)=DUMMY$:GOTO 1870
1860 IF I>8 AND LEN(B$(I))<28 TH
EN B$(I)=B$(I)+LEFT$(DUMMY$,28-L
EN(B$(I)))
1870 WRITE #2,B$(I)
1880 PUT #2,RECORD
1890 IF I>9 THEN B$(I)=" "
1900 RECORD=RECORD+1
1910 NEXT I
1920 WRITE #2,STR$(RECORD)
1930 PUT #2,1
1940 CLOSE #2
1950 REM CHECK DISK FOR NAME FIL
E
1960 OPEN "D",#1,"NAMES",93
1970 IF LOF(1)=0 THEN 2020
1980 GET #1,1
1990 INPUT #1,Q$
2000 LET LASTREC=VAL(Q$)
2010 GOTO 2050
2020 Q$="1"
2030 WRITE #1,Q$
2040 PUT #1,1
2050 CLOSE #1
2060 REM UPDATE NAME FILE
2070 E$=B$(1)+B$(2)+B$(3)+B$(4)+
B$(5)+B$(6)+B$(7)+B$(8)+STR$(STA
RTREC)
2080 OPEN "D",#1,"NAMES",93
2090 GET #1,1
2100 INPUT #1,Q$
2110 LET LASTREC=VAL(Q$)
2120 REM ADVANCE RECORD POINTER
2130 LET LASTREC=LASTREC+1
2140 WRITE #1,E$
2150 PUT #1,LASTREC
2160 WRITE #1,STR$(LASTREC)
2170 PUT #1,1
2180 CLOSE #1
2190 CLS
2200 LOCATE 1,8:PRINT "DATA HAS
BEEN SAVED TO DISK"
2210 LOCATE 1,10:PRINT "PRESS (M
) FOR MENU"
2220 LOCATE 1,12:PRINT "PRESS (E
) FOR NEXT ENTRY"
2230 IF LASTREC<50 THEN 2270
2240 LOCATE 1,16:PRINT"CAUTION D
ISK IS FULL"
2250 LOCATE 1,18:PRINT"FURTHER E
NTRIES MAY CRASH SYSTEM"
2260 LOCATE 1,20:PRINT"INSERT A
NEW DISK FOR MORE ENTRIES"
2270 Q$=INKEY$:IF Q$="" THEN 227
0
2280 IF Q$="E" THEN FOR I=1 TO 1
04:B$(I)="":NEXT I:GOTO 410
2290 IF Q$<>"M" THEN 2270
```

```
2300 GOTO 300
2310 CLS:END
2320 REM SEARCH ROUTINE
2330 CLS
2340 X=0
2350 LOCATE 10,1:PRINT A$(105)
2360 FOR I=106 TO 124
2370 LOCATE 1,I-104:PRINT A$(I)
2380 NEXT I
2390 FOR I=1 TO 6
2400 LOCATE 12,I+2:LINE INPUT S$
(I)
2410 NEXT I
2420 LOCATE 12,11:LINE INPUT S$(
7)
2430 IF VAL(S$(7))<>0 THEN FOR K
=8 TO 11:S$(K)="0":NEXT K:GOTO 2
480
2440 LOCATE 12,12:LINE INPUT S$(
8)
2450 LOCATE 12,13:LINE INPUT S$(
9)
2460 LOCATE 12,14:LINE INPUT S$(
10)
2470 LOCATE 12,15:LINE INPUT S$(
11)
2480 LOCATE 22,11:LINE INPUT S$(
12)
2490 IF VAL(S$(12))<>0 THEN FOR
K=13 TO 16:S$(K)="0":NEXT K:GOTO
 2550
2500 LOCATE 22,12:LINE INPUT S$(
13)
2510 LOCATE 22,13:LINE INPUT S$(
14)
2520 LOCATE 22,14:LINE INPUT S$(
15)
2530 LOCATE 22,15:LINE INPUT S$(
16)
2540 REM CHECK FOR VALID ENTRY
2550 FOR I=1 TO 16
2560 CHECKENTRY$=CHECKENTRY$+S$(
I)
2570 NEXT I
2580 IF CHECKENTRY$<>"" THEN 267
0
2590 CLS
2600 LOCATE 1,10:PRINT "PLEASE E
NTER VALID SEARCHING DATA"
2610 LOCATE 1,12:PRINT "PRESS (R
) TO REDO ROUTINE"
2620 LOCATE 1,14:PRINT "PRESS (M
) TO RETURN TO MENU"
2630 Q$=INKEY$:IF Q$="" THEN 263
0
2640 IF Q$="M" THEN 3540
```

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```
2650 IF Q$<>"R" THEN 2630
2660 GOTO 2320
2670 LOCATE 1,21:PRINT "PRESS (S
) TO BEGIN SEARCH"
2680 LOCATE 1,22:PRINT "PRESS (M
) TO RETURN TO MENU
2690 Q$=INKEY$:IF Q$="" THEN 269
0
2700 IF Q$="M" THEN 3540
2710 IF Q$<>"S" THEN 2690
2720 REM READ FILE AND SEARCH AR
RAY
2730 OPEN "D",#1,"NAMES",93
2740 FOR I=1 TO LOF(1)
2750 GET #1,I
2760 INPUT #1,Q$
2770 LET N$(I)=Q$
2780 NEXT I
2790 LASTREC=VAL(N$(1))
2800 FOR I=2 TO LASTREC
2810 IF S$(1)<>"" THEN IF S$(1)=
MID$(N$(I),1,LEN(S$(1))) THEN 28
20 ELSE 2980
2820 IF S$(2)<>"" THEN IF S$(2)=
MID$(N$(I),16,LEN(S$(2))) THEN 2
830 ELSE 2980
2830 IF S$(3)<>"" THEN IF S$(3)=
MID$(N$(I),31,LEN(S$(3))) THEN 2
840 ELSE 2980
2840 IF VAL(S$(4))<>0 THEN IF S$
(4)=MID$(N$(I),46,8) THEN 2850 E
LSE 2980
2850 IF VAL(S$(5))<>0 THEN IF S$
(5)=MID$(N$(I),54,8) THEN 2860 E
LSE 2980
2860 IF VAL(S$(6))<>0 THEN IF S$
(6)=MID$(N$(I),62,8) THEN 2870 E
LSE 2980
2870 IF VAL(S$(7))<>0 THEN IF S$
(7)=MID$(N$(I),70,8) THEN 2880 E
LSE 2980
2880 IF VAL(S$(8))<>0 THEN IF VA
L(S$(8))=>VAL(MID$(N$(I),70,8))
THEN 2890 ELSE 2980
2890 IF VAL(S$(9))<>0 THEN IF VA
L(S$(9))=<VAL(MID$(N$(I),70,8))
THEN 2900 ELSE 2980
2900 IF VAL(S$(10))<>0 THEN IF V
AL(S$(10))=<VAL(MID$(N$(I),70,8)
)  AND VAL(S$(11))=>VAL(MID$(N$(
I),70,8)) THEN 2910 ELSE 2980
2910 IF VAL(S$(12))<>0 THEN IF S
$(12)=MID$(N$(I),78,8) THEN 2920
 ELSE 2980
2920 IF VAL(S$(13))<>0 THEN IF V
AL(S$(13))=>VAL(MID$(N$(I),78,8)
) THEN 2930 ELSE 2980
2930 IF VAL(S$(14))<>0 THEN IF V
AL(S$(14))=<VAL(MID$(N$(I),78,8)
) THEN 2940 ELSE 2980
2940 IF VAL(S$(15))<>0 THEN IF V
AL(S$(15))=<VAL(MID$(N$(I),78,8)
) AND VAL(S$(16))=>VAL(MID$(N$(I
),78,8)) THEN 2950 ELSE 2980
2950 LET STORE$(X)=N$(I)
2960 LET H(X)=I
2970 X=X+1
2980 NEXT I
2990 Y=0:W=0
3000 CLOSE #1
3010 IF X>0 THEN OPEN "D",#2,"DA
TA",32
3020 IF X>0 THEN OPEN "D",#1,"NA
MES",93
3030 CLS
3040 LOCATE 1,1
3050 IF X=1 THEN PRINT"THERE WAS
 (";X;") MATCH FOUND"
3060 IF X>1 THEN PRINT"THERE WAS
 (";X;") MATCHES FOUND"
3070 IF X<1 THEN PRINT"THERE WAS
NO MATCHES FOUND"
3080 FOR I=130 TO 136
3090 LOCATE 1,I-126:PRINT A$(I)
3100 NEXT I
3110 Q$=INKEY$:IF Q$="" THEN 311
0
3120 IF Q$<"1" OR Q$>"6" THEN 31
10
3130 IF Q$="4" AND X=0 THEN PRIN
T "ILLEGAL COMMAND,NO NEXT RECOR
D":GOTO 3110
3140 IF Q$<="5"  AND X=0 THEN PR
INT "ILLEGAL COMMAND,NO RECORD I
N MEMORY":GOTO 3110
3150 IF Q$="4" AND X=0 THEN PRIN
T "ILLEGAL COMMAND,NO NEXT RECOR
D":GOTO 3110
3160 IF  Q$<>"6" AND X=0 THEN PR
INT "ILLEGAL COMMAND,NO MATCHES
FOUND":GOTO 3110
3170 ON VAL(Q$) GOTO 3190,3570,4
310,4560,4650,6060
3180 REM DISPLAY RECORD
3190 T=1
3200 T=1
3210 Z=VAL(MID$(STORE$(Y),87,4))
3220 FOR I=Z TO Z+103
3230 GET #2,I
3240 INPUT #2,B$(T)
3250 IF B$(T)=DUMMY$ THEN B$(T)=
" "
3260 W=W+1:T=T+1
3270 NEXT I
3280 CLS
3290 FOR I=1 TO 16
3300 LOCATE 1,I:PRINT A$(I);B$(I
)
```

```
3310 NEXT I
3320 Q$=INKEY$:IF Q$<>" " THEN 3
320
3330 IF Q$="Q" THEN 3540
3340 CLS
3350 FOR I=17 TO 35
3360 LOCATE 1,I-16:PRINT A$(I);B
$(I)
3370 NEXT I
3380 Q$=INKEY$:IF Q$<>" " THEN 3
380
3390 CLS
3400 FOR I=36 TO 58
3410 LOCATE 1,I-36:PRINT A$(I);B
$(I)
3420 NEXT I
3430 Q$=INKEY$:IF Q$<>" " THEN 3
430
3440 CLS
3450 FOR I=59 TO 81
3460 LOCATE 1,I-59:PRINT A$(I);B
$(I)
3470 NEXT I
3480 Q$=INKEY$:IF Q$<>" " THEN 3
480
3490 CLS
3500 FOR I=82 TO 104
3510 LOCATE 1,I-82:PRINT A$(I);B
$(I)
3520 NEXT I
3530 Q$=INKEY$:IF Q$<>" " THEN 3
530
3540 CLS
3550 GOTO 3080
3560 REM PRINTER ROUTINE
3570 T=1
3580 Z=VAL(MID$(STORE$(Y),87,4))
3590 FOR I=Z TO Z+103
3600 GET #2,I
3610 INPUT #2,B$(T)
3620 IF B$(T)=DUMMY$ THEN B$(T)=
" "
3630 W=W+1:T=T+1
3640 NEXT I
3650 PRINT #-2,CHR$(27);CHR$(22)
3660 CLS
3670 LOCATE 1,10:PRINT "ENSURE T
OP OF PRINTER PAGE"
3680 LOCATE 1,12:PRINT " IS FLUS
H WITH ROLLER"
3690 LOCATE 1,14:PRINT "PRESS (P
) TO PRINT,OR (Q) TO QUIT"
3700 Q$=INKEY$ :IF Q$="" THEN 37
00
3710 IF Q$="Q" THEN 4290
3720 IF Q$<>"P" THEN 3700
3730 FOR I=1 TO 47
3740 PRINT #-2,CHR$(27);CHR$(54)
3750 NEXT I
```

```
3760 PRINT #-2,CHR$(15);CHR$(27)
;CHR$(14)
3770 PRINT #-2,CHR$(27);CHR$(21)
3780 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3790 PRINT #-2,"FAMILY HISTORY I
NFORMATION"
3800 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3810 PRINT #-2,CHR$(14);CHR$(27)
;CHR$(15)
3820 FOR I=1 TO 16
3830 PRINT #-2,TAB(6);A$(I);B$(I
)
3840 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3850 NEXT I
3860 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3870 PRINT #-2,CHR$(15);CHR$(27)
;CHR$(14)
3880 PRINT #-2,"PERSONNAL NOTES"
3890 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3900 PRINT #-2,CHR$(14);CHR$(27)
;CHR$(15)
3910 FOR I=17 TO 35
3920 PRINT #-2,TAB(6);A$(I);B$(I
)
3930 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3940 NEXT I
3950 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3960 PRINT #-2,CHR$(15);CHR$(27)
;CHR$(14)
3970 PRINT #-2,"PERSONAL FAMILY,
FIRST MARRIAGE"
3980 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
3990 PRINT #-2,CHR$(14);CHR$(27)
;CHR$(15)
4000 FOR I=36 TO 58
4010 PRINT #-2,TAB(6);A$(I);B$(I
)
4020 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
4030 NEXT I
4040 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(36)
4050 PRINT #-2,CHR$(15);CHR$(27)
;CHR$(14)
4060 PRINT #-2,"PERSONAL FAMILY,
 SECOND MARRIAGE"
4070 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
4080 PRINT #-2,CHR$(14);CHR$(27)
;CHR$(15)
4090 FOR I=59 TO 81
```

```
4100 PRINT #-2,TAB(6);A$(I);B$(I
)
4110 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
4120 NEXT I
4130 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
4140 PRINT #-2,CHR$(15);CHR$(27)
;CHR$(14)
4150 PRINT #-2,"PERSONAL FAMILY,
THIRD MARRIAGE"
4160 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
4170 PRINT #-2,CHR$(14);CHR$(27)
;CHR$(15)
4180 FOR I=82 TO 104
4190 PRINT #-2,TAB(6);A$(I);B$(I
)
4200 PRINT #-2,CHR$(27);CHR$(90)
;CHR$(12)
4210 NEXT I
4220 PRINT #-2,CHR$(27);CHR$(22)
4230 FOR I=1 TO 35
4240 PRINT #-2,CHR$(27);CHR$(54)
4250 NEXT I
4260 LOCATE 1,22
4270 PRINT "PRESS (M) TO RETURN
TO MENU"
4280 Q$=INKEY$:IF Q$<>"M" THEN 4
280
4290 CLS
4300 GOTO 3080
4310 T=1
4320 REM PRINT OUT PARTIAL RECOR
D
4330 Z=VAL(MID$(STORE$(Y),87,4))
4340 FOR I=Z TO Z+103
4350 GET #2,I
4360 INPUT #2,B$(T)
4370 IF B$(T)=DUMMY$ THEN B$(T)=
" "
4380 W=W+1:T=T+1
4390 NEXT I
4400 CLS
4410 LOCATE 1,10:PRINT "ENSURE T
OP OF PRINTER PAGE"
4420 LOCATE 1,12:PRINT "IS FLUSH
 WITH ROLLER"
4430 LOCATE 1,14:PRINT "PRESS (P
) TO PRINT,(Q) TO QUIT"
4440 Q$=INKEY$:IF Q$="" THEN 444
0
4450 IF Q$="Q" THEN 4530
4460 IF Q$<>"P" THEN 4440
4470 PRINT #-2,CHR$(15);CHR$(27)
;CHR$(14)
4480 PRINT #-2,"FAMILY HISTORY I
NFORMATION"
4490 PRINT #-2,CHR$(14);CHR$(27)
```

```
;CHR$(15)
4500 FOR I=1 TO 16
4510 PRINT #-2,TAB(6);A$(I);B$(I
)
4520 NEXT I
4530 CLS
4540 GOTO 3080
4550 REM DISPLAY NEXT RECORD
4560 Y=Y+1
4570 W=1
4580 X=X-1
4590 IF X<>0 THEN 4630
4600 PRINT "ILLEGAL COMMAND,THER
E IS NO NEXT RECORD "
4610 PRINT
4620 GOTO 3110
4630 GOTO 3190
4640 REM CHANGE RECORD
4650 T=1
4660 Z=VAL(MID$(STORE$(Y),87,4))
4670 FOR I=Z TO Z+103
4680 GET #2,I
4690 INPUT #2,B$(T)
4700 IF B$(T)=DUMMY$ THEN B$(T)=
" "
4710 T=T+1:NEXT I
4720 CLS
4730 FOR I=1 TO 16
4740 LOCATE 1,I:PRINT A$(I);B$(I
)
4750 NEXT I
4760 Q$=INKEY$:IF Q$="" THEN 476
0
4770 IF Q$=" " THEN 4880
4780 IF Q$<>"C" THEN 4760
4790 R=1:C=0
4800 LOCATE C,R
4810 IF R>16 THEN 4880
4820 Q$=INKEY$:IF Q$="" THEN 482
0
4830 IF Q$=CHR$(10) THEN R=R+1:G
OTO 4800
4840 IF Q$<>CHR$(8) AND Q$<>CHR$
(9) THEN 4820
4850 LOCATE 12,R:PRINT "
                    "
4860 LOCATE 12,R:LINE INPUT B$(R
)
4870 GOTO 4800
4880 CLS
4890 CLS
4900 FOR I=17 TO 35
4910 LOCATE 1,I-16:PRINT A$(I);B
$(I)
4920 NEXT I
4930 Q$=INKEY$:IF Q$="" THEN 493
0
4940 IF Q$=" " THEN 5050
4950 IF Q$<>"C" THEN 4930
```

```
4960 R=17:C=0
4970 LOCATE C,R-16
4980 IF R>35 THEN 5050
4990 Q$=INKEY$:IF Q$="" THEN 499
0
5000 IF Q$=CHR$(10) THEN R=R+1:G
OTO 4970
5010 IF Q$<>CHR$(8) AND Q$<>CHR$
(9) THEN 4990
5020 LOCATE 12,R-16:PRINT "
          "
5030 LOCATE 12,R-16 :LINEINPUT B
$(R)
5040 GOTO 4970
5050 CLS
5060 CLS
5070 FOR I=36 TO 58
5080 LOCATE 1,I-36:PRINT A$(I);B
$(I)
5090 NEXT I
5100 Q$=INKEY$:IF Q$="" THEN 510
0
5110 IF Q$=" " THEN 5240
5120 IF Q$<>"C" THEN 5100
5130 R=36:C=0
5140 LOCATE C,R-36
5150 IF R>58 THEN 5240
5160 IF R=40 OR R=49 THEN R=R+1
5170 Q$=INKEY$:IF Q$="" THEN 517
0
5180 IF Q$=CHR$(10) THEN R=R+1:G
OTO 5140
5190 IF Q$<>CHR$(8) AND Q$<>CHR$
(9) THEN 5170
5200 IF R>40 THEN C=0 ELSE C=12
5210 LOCATE C ,R-36 :PRINT"
          "
5220 LOCATE C,R-36:LINE INPUT B$
(R)
5230 GOTO 5140
5240 CLS
5250 CLS
5260 FOR I=59 TO 81
5270 LOCATE 1,I-59:PRINT A$(I);B
$(I)
5280 NEXT I
5290 Q$=INKEY$:IF Q$="" THEN 529
0
5300 IF Q$=" " THEN 5430
5310 IF Q$<>"C" THEN 5290
5320 R=59:C=0
5330 LOCATE C,R-59
5340 IF R>81 THEN 5430
5350 IF R=63 OR R=72 THEN R=R+1
5360 Q$=INKEY$:IF Q$="" THEN 536
0
```

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```
5370 IF Q$=CHR$(10) THEN R=R+1:G
OTO 5330
5380 IF Q$<>CHR$(8) AND Q$<>CHR$
(9) THEN 5360
5390 IF R>63 THEN C=0 ELSE C=12
5400 LOCATE C,R-59 :PRINT"
               "
5410 LOCATE C,R-59 :LINE INPUT B
$(R)
5420 GOTO 5330
5430 CLS
5440 CLS
5450 FOR I=82 TO 104
5460 LOCATE 1,I-82:PRINT A$(I);B
$(I)
5470 NEXT I
5480 Q$=INKEY$:IF Q$="" THEN 548
0
5490 IF Q$=" " THEN 5620
5500 IF Q$<>"C" THEN 5480
5510 R=82:C=0
5520 LOCATE C,R-82
5530 IF R>104 THEN 5620
5540 IF R=86 OR R=95 THEN R=R+1
5550 Q$=INKEY$:IF Q$="" THEN 555
0
5560 IF Q$=CHR$(10) THEN R=R+1:G
OTO 5520
5570 IF Q$<>CHR$(8) AND Q$<>CHR$
(9) THEN 5550
5580 IF R>86 THEN C=0 ELSE C=12
5590 LOCATE C,R-82:PRINT "
               "
5600 LOCATE C,R-82:LINE INPUT B$
(R)
5610 GOTO 5520
5620 CLS
5630 LOCATE 1,10:PRINT "PRESS (S
) TO SAVE DATA ON DISK"
5640 LOCATE 1,12:PRINT "       (M
) TO RETURN TO MENU"
5650 Q$=INKEY$:IF Q$="" THEN 565
0
5660 IF Q$="M" THEN 6030
5670 IF Q$<>"S" THEN 5650
5680 REM SAVE DATA TO DATA FILE
5690 CLS
5700 T=1
5710 LOCATE 1,10:PRINT"SAVING DA
TA ON DISK"
5720 IF LEN(B$(1))<15 THEN B$(1)
=B$(1)+" " :GOTO 5720
5730 IF LEN(B$(1))>15 THEN B$(1)
=LEFT$(B$(1),15)
5740 IF LEN(B$(2))<15 THEN B$(2)
=B$(2)+" ":GOTO 5740
5750 IF LEN(B$(2))>15 THEN B$(2)
=LEFT$(B$(2),15)
5760 IF LEN(B$(3))<15 THEN B$(3)
=B$(3)+" ":GOTO 5760
5770 IF LEN(B$(3))>15 THEN B$(3)
=LEFT$(B$(3),15)
5780 IF LEN(B$(4))<8 THEN B$(4)=
B$(4)+" ":GOTO 5780
5790 IF LEN(B$(4))>8 THEN B$(4)=
LEFT$(B$(4),8)
5800 IF LEN(B$(5))<8 THEN B$(5)=
B$(5)+" ":GOTO 5800
5810 IF LEN(B$(5))>8 THEN B$(5)=
LEFT$(B$(5),8)
5820 IF LEN(B$(6))<8 THEN B$(6)=
B$(6)+" ":GOTO 5820
5830 IF LEN(B$(6))>8 THEN B$(6)=
LEFT$(B$(6),8)
5840 IF LEN(B$(7))<8 THEN B$(7)=
B$(7)+" ":GOTO 5840
5850 IF LEN(B$(7))>8 THEN B$(7)=
LEFT$(B$(7),8)
5860 IF LEN(B$(8))<8 THEN B$(8)=
B$(8)+" ":GOTO 5860
5870 IF LEN(B$(8))>8 THEN B$(8)=
LEFT$(B$(8),8)
5880 FOR I=Z TO Z+103
5890 IF LEN(B$(I))=0 THEN B$(I)=
DUMMY$:GOTO 5910
5900 IF I>8 AND LEN(B$(I))<28 TH
EN B$(I)=B$(I)+LEFT$(DUMMY$,28-L
EN(B$(I)))
5910 WRITE #2,B$(T)
5920 PUT #2,I
5930 IF T>9 THEN B$(T)=" "
5940 T=T+1
5950 NEXT I
5960 REM SAVE DATA TO NAME FILE
5970 E$=B$(1)+B$(2)+B$(3)+B$(4)+
B$(5)+B$(6)+B$(7)+B$(8)+STR$(Z)
5980 WRITE #1,E$
5990 PUT #1,H(Y)
6000 LOCATE 1,16:PRINT "DATA HAS
 BEEN SAVED ON DISK"
6010 LOCATE 1,18:PRINT "PRESS (M
) TO RETURN TO MENU"
6020 Q$=INKEY$:IF Q$<>"M" THEN 6
020
6030 CLS
6040 GOTO 3080
6050 REM RETURN TO MAIN MENU
6060 CLOSE #2
6070 CLOSE #1
6080 GOTO 300
6090 REM SUB SCREEN DISPLAY ARRA
Y
6100 FOR I=1 TO 136
6110 READ Q$
6120 LET A$(I)=Q$
6130 NEXT I
6140 GOTO 280
6150 DATA LASTNAME   ;,FIRSTNAME
```

```
;,MIDDLENAME;
6160 DATA GENERATION;,LINEAGE NO
;,BAPTIZED ;
6170 DATA BORN DATE ;,DIED DATE
;,FATHER LST;
6180 DATA "       FST;","
MID;",MOTHER LST;
6190 DATA "       FST;","
MID;",NO. OF BRS;
6200 DATA NO. OF SIS;,GOD FATHER
;,GOD MOTHER;
6210 DATA NICKNAME  ;,BORN LOC
;,RESIDENCE ;
6220 DATA B'RD LOC  ;,RELIGION
;,SCHOOLING ;
6230 DATA "          ;","
   ;","         ;"
6240 DATA OCC/TRADE ;,"
 ;",EMPLOYMENT;
6250 DATA "          ;","
   ;",ABROAD    ;
6260 DATA "          ;",MILITARY
  ;,LASTNAME  ;
6270 DATA FIRSTNAME ;,MIDDLENAME
;,MAR'D DATE;
6280 DATA MAR'D LOC ;,BORN DATE
; SONS NAME
6290 DATA " "," "," "
6300 DATA " "," "," "
6310 DATA " "," ",BORN DATE ; DA
UGHTERS NAME
6320 DATA " "," "," "
6330 DATA " "," "," "
6340 DATA " "," ",LASTNAME  ;
6350 DATA FIRSTNAME ;,MIDDLENAME
;,MAR'D DATE;
6360 DATA MAR'D LOC ;,BORN DATE
; SONS NAME
6370 DATA " "," "," "
6380 DATA " "," "," "
6390 DATA " "," ",BORN DATE ; DA
UGHTERS NAME
6400 DATA " "," "," "
6410 DATA " "," "," "
6420 DATA " "," ",LASTNAME  ;
6430 DATA FIRSTNAME ;,MIDDLENAME
;,MAR'D DATE;
6440 DATA MAR'D LOC ;,BORN DATE
; SONS NAME
6450 DATA " "," "," "
6460 DATA " "," "," "
6470 DATA " "," ",BORN DATE ; DA
UGHTERS NAME
6480 DATA " "," "," "
6490 DATA " "," "," "
6500 DATA " "," ",SEARCHING CAN
BE BY;
6510 DATA "        ",LASTNAME  ;,
FIRSTNAME ;
6520 DATA MIDDLENAME;,GENERATION
;,LINEAGE # ;
6530 DATA BAPTIZED ;,"   ","
          BORN      DIED"
6540 DATA SPECIFIC ;           ,
UP TO    ;           ,AFTER
;
6550 DATA FROM     ;           ,
TO       ;
6560 DATA " "
6570 DATA DATES MUST BE ENTERED
AS;,"      ----",YEAR MONTH DAY
 ;YYYYMMDD
6580 DATA " "
6590 DATA 1/ENTER DATA,2/SEARCH
FILES
6600 DATA 3/QUIT,"   "
6610 DATA "    "
6620 DATA 1/DISPLAY RECORD,2/PRI
NTOUT COMPLETE RECORD
6630 DATA 3/PRINTOUT PARTIAL REC
ORD,4/DISPLAY NEXT RECORD
6640 DATA 5/CHANGE RECORD,6/RETU
RN TO MENU
6650 DATA " "
6660 RETURN
6670 CLS
6680 CLOSE #1:CLOSE #2
```

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CoCo 2
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```
6690 PRINT"A MAJOR SYSTEM ERROR
HAS OCCURED"
6700 PRINT"---------------------
----------------"
6710 PRINT"1/CHECK DISK DRIVE"
6720 PRINT"2/CHECK INFORMATION B
EING ENTERED"
6730 PRINT"3/CHECK PRINTER"
6740 PRINT
6750 PRINT"PRESS (SPACE) TO REST
ART PROGRAM"
6760 Q$=INKEY$:IF Q$<>" " THEN
6760
6770 GOTO 300
```

```
310 ......123
490 ......118
650 ......244
790 ......144
END .....241
```

Listing 2: CHART

```
90 REM (C) BRIAN LE BLANC
95 REM JANUARY 24 1987
100 CLS
110 PRINT #-2,CHR$(30)
120 PRINT #-2,CHR$(27);CHR$(22)
130 WIDTH 40
140 PRINT"THIS PROGRAM WILL MAKE
 PRINTOUTS OF"
150 PRINT"THE GENEOLOGY CHART"
160 PRINT"----------------------
-----------"
170 PRINT "HOW MANY COPIES OF TH
E CHART"
180 LINEINPUT Q$
190 LET PGONE=VAL(Q$)
200 PRINT"----------------------
------------"
210 LOCATE 1,10:PRINT "ENSURE TO
P OF PRINTER PAGE"
220 LOCATE 1,12:PRINT " IS FLUSH
 WITH ROLLER"
230 LOCATE 1,14:PRINT "PRESS (P)
 TO PRINT,OR (Q) TO QUIT"
240 Q$=INKEY$ :IF Q$="" THEN 240
250 IF Q$="Q" THEN 1000
260 IF Q$<>"P" THEN 240
270 FOR I=1 TO 50:PRINT #-2,CHR$
(27);CHR$(54):NEXT I
280 G$=CHR$(95)
290 A$=G$+G$+G$+G$+G$+G$+G$+G$+G
$+G$+G$+G$+G$
300 B$=CHR$(240)+CHR$(241)
310 C$=CHR$(246)+CHR$(241)
320 D$=CHR$(241)+CHR$(249)
330 E$=CHR$(62)
340 F$=CHR$(245)
350 FOR J=1 TO PGONE
360 PRINT#-2,CHR$(27);CHR$(14);T
AB(15);"LINEAGE CHART";CHR$(27);
CHR$(15)
370 PRINT#-2,TAB(71);"PAGE;";G$;
G$;G$
380 PRINT#-2
390 PRINT#-2
400 PRINT#-2,TAB(64);B$;A$;E$
410 PRINT#-2,TAB(64);F$;TAB(66);
A$
420 PRINT#-2,TAB(48);B$;A$;D$
430 PRINT#-2,TAB(48);F$;TAB(50);
A$;TAB(64);C$;A$;E$
440 PRINT#-2,TAB(48);F$;TAB(66);
A$
450 PRINT#-2,TAB(48);F$
460 PRINT#-2,TAB(32);B$;A$;D$
470 PRINT#-2,TAB(32);F$;TAB(34);
A$;TAB(48);F$;TAB(64);B$;A$;E$
480 PRINT#-2,TAB(32);F$;TAB(48);
F$;TAB(64);F$;TAB(66);A$
490 PRINT#-2,TAB(32);F$;TAB(48);
C$;A$;D$
500 PRINT#-2,TAB(32);F$;TAB(50);
A$;TAB(64);C$;A$;E$
510 PRINT#-2,TAB(32);F$;TAB(66);
A$
520 PRINT#-2,TAB(32);F$
530 PRINT#-2,TAB(32);F$
540 PRINT#-2,TAB(16);B$;A$;D$;TA
B(64);B$;A$;E$
550 PRINT#-2,TAB(16);F$;TAB(18);
A$;TAB(32);F$;TAB(64);F$;TAB(66)
;A$
560 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(48);B$;A$;D$
570 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(48);F$;TAB(50);A$;TAB(64)
;C$;A$;E$
580 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(48);F$;TAB(66);A$
590 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(48);F$
600 PRINT#-2,TAB(16);F$;TAB(32);
C$;A$;D$
610 PRINT#-2,TAB(16);F$;TAB(34);
A$;TAB(48);F$;TAB(64);B$;A$;E$
620 PRINT#-2,TAB(16);F$;TAB(48);
F$;TAB(64);F$;TAB(66);A$
630 PRINT#-2,TAB(16);F$;TAB(48);
C$;A$;D$
640 PRINT#-2,TAB(16);F$;TAB(50);
A$;TAB(64);C$;A$;E$
```

```
650 PRINT#-2,TAB(16);F$;TAB(66);
A$
660 PRINT#-2,TAB(16);F$
670 PRINT#-2,TAB(16);F$
680 PRINT#-2,TAB(2);A$;D$;TAB(64
);B$;A$;E$
690 PRINT#-2,TAB(2);A$;TAB(16);F
$;TAB(64);F$;TAB(66);A$
700 PRINT#-2,TAB(16);F$;TAB(48);
B$;A$;D$
710 PRINT#-2,TAB(16);F$;TAB(48);
F$;TAB(50);A$;TAB(64);C$;A$;E$
720 PRINT#-2,TAB(16);F$;TAB(48);
F$;TAB(66);A$
730 PRINT#-2,TAB(16);F$;TAB(48);
F$
740 PRINT#-2,TAB(16);F$;TAB(32);
B$;A$;D$
750 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(34);A$;TAB(48);F$;TAB(64)
;B$;A$;E$
760 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(48);F$;TAB(64);F$;TAB(66)
;A$
770 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(48);C$;A$;D$
780 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(50);A$;TAB(64);C$;A$;E$
790 PRINT#-2,TAB(16);F$;TAB(32);
F$;TAB(66);A$
800 PRINT#-2,TAB(16);F$;TAB(32);
F$
810 PRINT#-2,TAB(16);F$;TAB(32);
F$
820 PRINT#-2,TAB(16);C$;A$;D$;TA
B(64);B$;A$;E$
830 PRINT#-2,TAB(18);A$;TAB(32);
F$;TAB(64);F$;TAB(66);A$
840 PRINT#-2,TAB(32);F$;TAB(48);
B$;A$;D$
850 PRINT#-2,TAB(32);F$;TAB(48);
F$;TAB(50);A$;TAB(64);C$;A$;E$
860 PRINT#-2,TAB(32);F$;TAB(48);
F$;TAB(66);A$
870 PRINT#-2,TAB(32);F$;TAB(48);
F$
880 PRINT#-2,TAB(32);C$;A$;D$
890 PRINT#-2,TAB(34);A$;TAB(48);
F$;TAB(64);B$;A$;E$
900 PRINT#-2,TAB(48);F$;TAB(64);
F$;TAB(66);A$
910 PRINT#-2,TAB(48);C$;A$;D$
920 PRINT#-2,TAB(50);A$;TAB(64);
C$;A$;E$
930 PRINT#-2,TAB(66);A$
940 FOR I=1 TO 8 :PRINT#-2,CHR$(
27);CHR$(54):NEXT I
950 NEXT J
1000 END
```

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16K ECB

Understanding Verb Use

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

I'd like to offer my thanks to all of you who sent letters of encouragement with suggestions on new educational programs. Judging from my mail, many of you have enjoyed our *Life Skills* series as well as our newer series on *How Your Body Works*.

I regret that I cannot offer individual responses to your kind letters; however, I am sure all of you would rather I spent what little time I have available for programming rather than for corresponding, especially when many requests for help with program bugs are simply a result of incorrect typing.

With your letters and suggestions in mind, I am presenting a slightly different educational program this month, titled *Conjugate Instructor*. It will help with some English grammar skills that are too often neglected by software writers: the sometimes confusing skill of conjugating verbs, both regular and irregular. This program will allow you to study the various forms of the verb "be" as used in the present, past, future, present perfect, past perfect and future perfect tenses. The best part of *Conjugate Instructor*, unlike some other "Wishing Well" programs, is that you add absolutely *nothing* to it in terms of data. The program is designed to generate its own text sample sentences. The random possibilities are great, in fact. With all of its features, it is designed to keep from constantly repeating the same examples and, hence, boring you to death.

Why Verbs

About four years ago I listed a program in our second "Wishing Well" called *VerbQuiz*, which dealt with irregular verbs in the present, past and past participle. It was a relatively simple program that required you to supply the three forms of any irregular verbs you wanted to have the program quiz. You would then store these verbs in `DATA` statements at the end of the program, which would generate sentences such as:

Today I eat it.
Yesterday I ate it.
I have eaten it many times.

The verbs you selected would fit into sample sentences such as the ones above. While the program is a valuable tool in grammar education, it is limited to using irregular verbs (i.e., verbs that change in each of their tenses). There is little sense in using verbs that do not change in their written form, such as:

Today I read it.
Yesterday I read it.
I have read it many times.

As you can see, all the responses would be the same. I have always wanted to go one step further, but I haven't really had the need to develop any new English programs, since for most of the last few years I have been teaching either math or, more recently, science and history to my students.

Some readers suggested I develop more programs along this line, but the spark just wasn't there. This summer, things changed a bit. A good friend asked me to tutor her son, Kevin, during the summer in both math and English. In fact, Kevin is an average student. His mother just wanted him to get a little help before returning to school in the fall for his final year in middle school.

As part of Kevin's work, I dug up the old *VerbQuiz* and let him work with it. As you all know, since necessity is the mother of invention, the stimulus I needed to create a new English grammar program was no longer lacking. Therefore, Kev, this one's for you!

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

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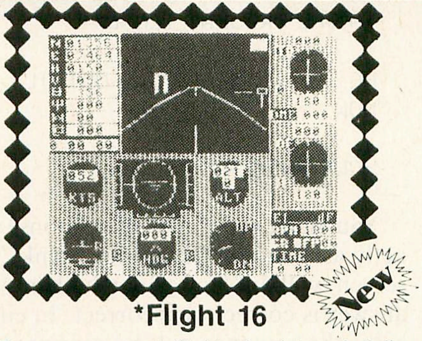

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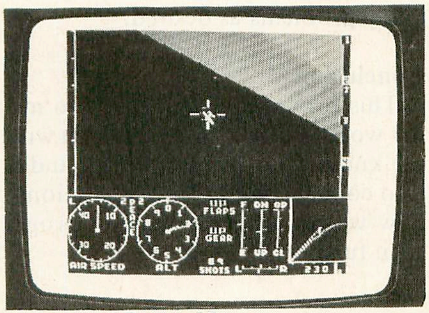

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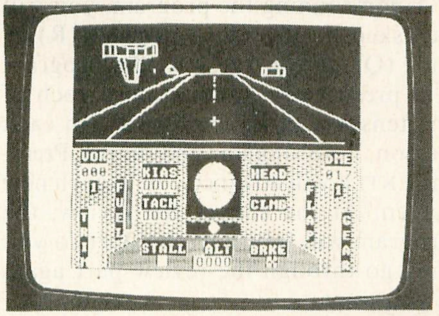

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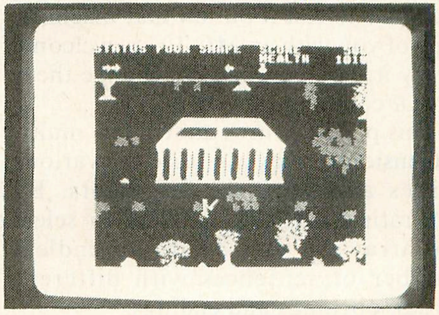

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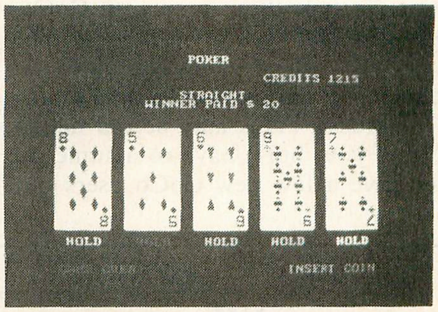

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The Program

Conjugate Instructor, unlike *Verb-Quiz*, is designed to be instructional as well as a quiz program. It is written entirely with Color BASIC commands, so it should work on the Color Computer 1, 2 and 3. (It should even work on the MC-10 with 20K, but I have not had a chance to test it out on that machine. Any of you with an MC-10 are welcome to try it; you will have to change the - TIMER command to -9999.)

This program uses quite a few multi-dimensional arrays to store the various tenses and sentence fragments. By generating random numbers to select the arrays, it can create an endless number of sentences with different tenses, openings and endings.

One drawback is the time it takes to set up these arrays. I have included a PLEASE STAND BY screen so you do not think your computer has locked up. There is quite a bit of data to read in, and each verb is also recreated in an inverse video form so you can obtain a flashing effect on the screen.

When typing in the program, you will notice some lowercase letters in the listing. To type these in on your CoCo, press SHIFT-0 to get into lowercase. The letters will appear as inverse video on the screen. Press SHIFT-0 again to return to uppercase. (This may be old hat to most of you, but I have to assume we may have a few new CoCo users out there who do not know these little tricks. I always get a few letters about these simple things each month.)

Running the Program

Upon running the program, you will be asked if you want to review (R) or quiz (Q). If you press R, the program will present an explanation of each of the tenses with the correct use in each person, both singular and plural. Pressing ENTER will advance you to each new screen. At the end of the review, the program will return to the start so you may go through the review part again if you want.

If you press Q, the program will then ask you to select a difficulty level, 1 through 6. The levels correspond to the various tenses in order:

1) Present
2) Past
3) Future
4) Present Perfect
5) Past Perfect
6) Future Perfect

After selecting a level, you will be asked if you want to have the levels assorted. If you press N for no, the program will quiz you only on the level you selected. If you press Y for yes, then the program will jumble the tenses up to the level you selected.

After making this choice, the program will ask you to PLEASE STAND BY. The screen will next read something like:

```
STATEMENT NUMBER 1.
HOW WOULD YOU CONJUGATE <BE>
IN THE PRESENT TENSE?

HE . . . . . SITTING QUIETLY
NOW.

YOUR ANSWER=>
```

You must type in your response exactly as it should fit into the blank. The screen will inform you whether your answer is correct or incorrect. In either case, the sentence will be reprinted on the screen with the correct answer flashing in the sentence. This serves as a good visual indicator. You may continue to the next problem by pressing ENTER. To check your score, press the (@) key. The score card will then come up on the screen. To continue with the program, press C. You may rerun the program by pressing Y for yes or end by pressing N for no. You may do as many problems as desired.

Conclusion

This program was valuable to me in my work with Kevin. I hope you will let me know what you think of it and will also come up with some suggestions on how we can take this type of program even further. ☐

40	141	395	118
110	189	495	132
205	101	530	84
300	119	END	202

The listing: VERBTEST

```
1 REM****************************
2 REM*  CONJUGATE INSTRUCTOR    *
3 REM*    CONJUGATING <BE>      *
4 REM*    BY FRED B.SCERBO      *
5 REM*     60 HARDING AVE       *
6 REM*  NORTH ADAMS,MA 01247    *
7 REM*   COPYRIGHT (C) 1987     *
8 REM*   DEDICATED TO KEVIN     *
9 REM****************************
10 CLEAR2200:CLS0:FORI=1TO32:PRI
NTCHR$(188);:NEXT:FORI=1TO288:RE
ADA:PRINTCHR$(A+128);:NEXT:FORI=
1TO32:PRINTCHR$(188);:NEXT
15 DATA46,44,44,42,46,44,45,37,4
2,,42,44,44,45,44,40,42,,37,37,4
4,44,44,37,44,44,42,44,46,40,46,
44
20 DATA42,,32,40,42,,37,37,45,32
,42,,,37,,,42,,37,37,,,,37,,,42,
,42,,42,
25 DATA42,,,,42,,37,37,36,42,42,
,,37,,,42,,37,37,,,,37,,,42,,42,
,42,
30 DATA42,,,,42,,37,37,,45,42,,,
37,,,42,,37,37,,35,35,37,35,35,4
2,,42,,43,35
35 DATA42,,,,42,,37,37,,36,42,,,
37,,,42,,37,37,,,37,37,,32,42,,4
2,,42,
40 DATA43,35,35,42,43,35,39,37,3
2,32,42,37,35,39,,,43,35,39,37,3
5,35,39,37,,,42,,42,32,43,35
45 DATA76,78,72,79,66,74,78,76,7
6,68,76,78,76,69,76,76,74,74,,74
,78,76,72,76,77,76,72,78,77,69,7
6,77
50 DATA,74,,74,77,74,76,76,77,,,
74,,69,76,78,72,74,,74,74,,,,69,
,,74,69,69,76,78
55 DATA76,76,72,72,,72,76,76,76,
,,72,,68,,76,72,76,76,72,76,76,7
2,,68,,,76,76,68,,76
60 PRINT@357," CONJUGATION  OF <
BE> ";
65 PRINT@389,"   BY FRED B.SCERB
O    ";
70 PRINT@421,"  COPYRIGHT (C) 19
87  ";
75 PRINT@453,"  <R>EVIEW OR <Q>U
IZ  ";
80 X$=INKEY$:MU=RND(-TIMER):IFX$
=""THEN80
85 IFX$="R"THEN RV=1:GOTO145
90 IFX$="Q"THEN RV=0:GOTO100
95 GOTO80
100 PRINT@453,"  DIFFICULTY (1 -
 6)   ";
105 X$=INKEY$:IFX$=""THEN105
110 XX=VAL(X$):IFXX>6THEN105
115 IFXX<1THEN105
120 PRINT@453,"   ASSORTED   (Y /
 N)   ";
125 X$=INKEY$:IFX$=""THEN125
130 IFX$="Y"THEN SS=1:GOTO145
135 IFX$="N"THEN SS=0:GOTO145
140 GOTO125
145 SW=30:CLS:PRINT@232,"PLEASE
STAND BY";
150 DIM N$(8),T$(6,8),WH$(6,6),L
K$(15),CJ$(6),RV$(6,8),EX$(6)
155 GOSUB160:GOTO215
160 FORI=1TO8:READN$(I):NEXT
165 FORI=1TO8:READT$(1,I):NEXT
170 FORI=1TO8:READT$(2,I):NEXT
175 READQ$:FORI=1TO8:T$(3,I)=Q$:
NEXT
180 FORI=1TO3:READT$(4,I):NEXT:T
$(4,4)=T$(4,3):T$(4,5)=T$(4,3):R
EADQ$:FORI=6TO8:T$(4,I)=Q$:NEXT
185 READQ$,V$:FORI=1TO8:T$(5,I)=
Q$:T$(6,I)=V$:NEXT
190 FORY=1TO6:FORI=1TO6:READWH$(
Y,I):NEXTI,Y
195 FORI=1TO15:READLK$(I):NEXT:F
ORI=1TO6:READ CJ$(I):NEXT:FORI=1
TO6:READ EX$(I):NEXT
200 FORI=1TO6:FORY=1TO8:Q=LEN(T$
(I,Y)):FORZ=1TOQ:H=ASC(MID$(T$(I
,Y),Z,1))+32:IFH=64THENH=32
205 RV$(I,Y)=RV$(I,Y)+CHR$(H):NE
XTZ,Y,I
210 RETURN
215 IF RV=0 THEN275
220 FORI=1TO6:CLS:PRINT:JK$="  "
+EX$(I):GOSUB350:PRINT
225 PRINT"    ";N$(1)" "T$(I,1)
230 PRINT"    ";N$(2)" "T$(I,2)
235 PRINT"    ";N$(3)","N$(4)","N
$(5)" "T$(I,3)
240 PRINT
245 PRINT"    ";N$(6)" "T$(I,6)
250 PRINT"    ";N$(7)" "T$(I,7)
255 PRINT"    ";N$(8)" "T$(I,8)
260 X$=INKEY$:IFX$=""THEN260
265 NEXTI
270 RUN
275 CLS:A=RND(8):B=RND(XX):C=RND
(6):D=RND(15):IFA=5 THEN D=1
280 IF SS=0 THEN B=XX
285 CR$="  "+N$(A)+" "+T$(B,A)+"
 "+LK$(D)+" "+WH$(B,C)+".":P$="
 "+N$(A)+" ...... "+LK$(D)+" "+W
H$(B,C)+"."
290 FL$="  "+N$(A)+" "+RV$(B,A)+
" "+LK$(D)+" "+WH$(B,C)+"."
295 KK=KK+1:CLS:PRINT@33," STATE
MENT NUMBER ";KK;"."
300 PRINT:PRINT" HOW WOULD YOU
CONJUGATE <BE>   IN THE ";CJ$(B
);" TENSE?"
305 PRINT@192,"";:JK$=P$:GOSUB35
0
310 PRINT:PRINT:PRINT"  YOUR ANS
WER=> ";:LINEINPUT YR$
315 PRINT:IF YR$=T$(B,A)THEN NR=
NR+1:PRINT"  YOU ARE CORRECT !!"
```

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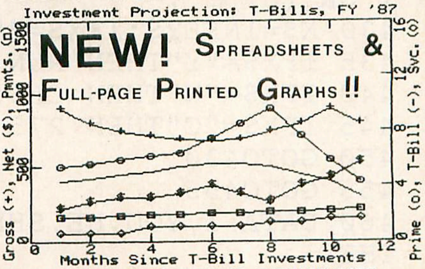

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```
:GOTO325
320 PRINT"  SORRY, THAT IS INCOR
RECT !!":NW=NW+1:GOTO325
325 PRINT:PRINT"  PRESS <ENTER>
TO CONTINUE.";
330 PRINT@192,"";:JK$=CR$:GOSUB3
50:PRINT@192,"";:JK$=FL$:GOSUB35
0
335 X$=INKEY$:IFX$="@"THEN390
340 IFX$<>CHR$(13)THEN330
345 GOTO275
350 IF LEN(JK$)<=SW THEN370
355 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN365
360 NEXT T:GOTO370
365 L$=LEFT$(JK$,T):W$=L$:GOSUB3
75:JK$="   "+RIGHT$(JK$,(LEN(JK$)
)-T):GOTO350
370 W$=JK$:PRINTW$:RETURN
375 PRINTW$:RETURN
380 REM SCORE CARD
385 REM NW=WRONG:NR=RIGHT
390 CLS:PRINT:PRINT:PRINT
395 PD=NR+NW:PRINTTAB(3)"PROBLEM
S COMPLETED  = "PD:PRINT
400 PRINTTAB(3)"CORRECT RESPONSE
S  = "NR:PRINT
405 PRINTTAB(3)"INCORRECT RESPON
SES = "NW:PRINT
410 TR=NR+NW:IFTR=0THENTR=1
415 SC=INT(NR/TR*100)
420 PRINTTAB(3)"YOUR TOTAL SCORE
 = "SC"%":PRINT
425 PRINTTAB(3)"ANOTHER TRY (Y/N
) OR (C) ?";
430 X$=INKEY$:IFX$=""THEN430
435 IFX$="Y"THEN RUN
440 IFX$="N"THEN CLS:END
445 IFX$="C"THEN 275
450 GOTO430
455 GOTO455
460 DATA I,YOU,HE,SHE,IT,WE,YOU,
THEY
465 DATA AM,ARE,IS,IS,IS,ARE,ARE
,ARE
470 DATA WAS,WERE,WAS,WAS,WAS,WE
RE,WERE,WERE
475 DATA WILL BE
480 DATA HAVE BEEN,HAVE BEEN,HAS
 BEEN,HAVE BEEN
485 DATA HAD BEEN
490 DATA WILL HAVE BEEN
495 DATA NOW,AT THIS MOMENT,TODA
Y,AS WE SPEAK,TODAY,AT THE PRESE
NT TIME
500 DATA LAST WEEK,AN HOUR AGO,Y
ESTERDAY,LAST NIGHT,LAST WEEK,LA
ST TUESDAY
505 DATA TOMORROW,NEXT WEEK,LATE
R ON,PRETTY SOON,AFTER SOME TIME
,IN A SHORT TIME
510 DATA FOR MANY YEARS,FOR ONLY
 ONE WEEK,SINCE 1984,SINCE LAST
JUNE,FOR ABOUT A MONTH NOW,FOR T
HREE SLEEPLESS NIGHTS
515 DATA BEFORE IT HAPPENED,EVER
 SINCE WE STARTED TALKING,BEFORE
 THE SHOW,WAY BEFORE THE MIDDLE
OF THE NIGHT,BEFORE WAITING FOR
A REPLY,BEFORE HEARING THE NEWS
520 DATA BY THE TIME IT IS FINIS
HED,IN THE NEAR FUTURE,AFTER A L
ITTLE WHILE,AFTER GRADUATION,AFT
ER THE CONCLUSION,AFTER THE TRAI
NING SESSION
525 DATA HERE,READING THIS BOOK,
LISTENING TO THE TAPE,WRITING LE
TTERS,LIVING HERE,OFFICIALLY ENR
OLLED,THE MOST QUALIFIED,VERY SA
TISFIED
530 DATA COMPLETELY DISGUSTED,IN
 GOOD HEALTH,TIRED OF WAITING,TY
PING A MANUSCRIPT,EARNING A LIVI
NG,SITTING QUIETLY,FLYING BY JET
PLANE
535 DATA PRESENT,PAST,FUTURE,PRE
SENT PERFECT,PAST PERFECT,FUTURE
 PERFECT
540 DATA THE present TENSE IS US
ED TO DESCRIBE SOMETHING WHICH I
S HAPPENING AT THIS MOMENT.
545 DATA THE past TENSE IS USED
TO DESCRIBE SOMETHING WHICH ALRE
ADY HAPPENED AND IS COMPLETED.
550 DATA THE future TENSE IS USE
D TO DESCRIBE ACTION WHICH HAS N
OT HAPPENED. IT IS FORMED BY ADD
ING will OR shall TO THE PRESENT
 TENSE.
555 DATA THE present perfect TEN
SE IS USED WITH ACTION WHICH STA
RTED EARLIER BUT MAY STILL BE CO
NTINUING. IT IS FORMED BY ADDING
 have OR has TO THE PAST PARTICI
PLE.
560 DATA THE past perfect IS USE
D TO DESCRIBE SOMETHING WHICH HA
PPENED BEFORE ANOTHER PAST ACTIO
N. IT USES THE HELPING VERB had
AND THE PAST PARTICIPLE.
565 DATA THE future perfect DESC
RIBES AN ACTION THAT WILL BE FIN
SIHED SOME TIME IN THE FUTURE. I
T USES will have OR shall have A
ND THE PAST PARTICIPLE.
```

DOWNLOADS

A Case of CDs and WORMs

By Dan Downard
Rainbow Technical Consultant

Since the introduction of the compact disc player, I have wondered if it would be possible to record programs and data on a CD. With the price of CD players at $200, would they work as fast as a disk drive or faster than my slowpoke cassette recorder? Would it cut down on annoying I/O Errors?

Andy Bailey
Madison, WV

Andy, you have the makings of an electronic pioneer. In fact, CDs are the upcoming technology for storage media, but at present there is no way to write to a CD. The CD players you are referring to are "play" only. Equipment to cut the masters for these CDs is very expensive.

Fear not, though, the latest technology is the WORM. A WORM is a "write once" memory disc that is coated with an organic dye. Once you write to it, you can read it as many times as you like. The problem with these drives is that they are extremely expensive, as a small system starts at around 10 gigabytes. Maybe you can use that much storage space for your library, but I can't imagine needing one for my CoCo.

Assembling Low Memory

I have a CoCo 3 with a disk drive and I recently purchased Disk EDTASM *from Radio Shack. When trying to assemble an 800-byte program (position independent), I got "bad memory" errors below H5600, but it assembled fine above that address.*

It seems, after some experimentation, that the object code interferes with the source code below this address. I am afraid that for larger programs, I will have to assemble at even higher addresses, leaving little RAM for my program. Do I need a different assembler for the CoCo 3, or can you suggest a solution for using Disk EDTASM *on this computer? Is there any way to access memory above $FFFF using this, or other, assemblers?*

David Harris
Utica, MI

David, you can't assemble programs in low memory due to conflicts with low RAM pointers in the CoCo. At the same time you don't have to assemble programs in memory. If you issue the command A without an IM, you will indeed assemble the program in the next free memory area available to your assembler program.

BBS Garbage

I have a CoCo 3 with a Multi-Pak Interface and one disk drive. I am attempting to use a Modem 1-B with an RS-232 interface without success. I can dial onto the BBS, but I end up with complete garbage on the screen. What is my problem?

Richard A. Yehle
Sacramento, CA

Richard, make sure you have the baud rate of your software set to 300. The Modem 1-B is only capable of 300 baud. Evidently, it is working, since you are at least getting garbage on your screen.

CoCo 3 Memory Capacity

I just bought my new CoCo 3. I typed `PRINT MEM`, *and it said 22824 with my disk drive plugged in. Is something wrong with it? I thought you got more memory with a new CoCo 3.*

Sean E. Bishop
Hazard, KY

Sean, my CoCo 3 has 512K in it and I get the same memory as you do. In fact, you must have OS-9 Level II to take advantage of the extra memory for programs. At present, though, you can use the extra memory for graphics. BASIC still limits you to 22K (if you don't `PCLEAR1`) for programs.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Your technical questions may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "Downloads" online form, which has complete instructions.

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago, and he has built several 68XX systems.

OS-9 PROGRAMMING

Using Compressed Files

By Peter Dibble

Compressed files are a wonderfully useless way to consume disk space unless you have a program to uncompress them. Fortunately, it is even easier to uncompress run length encoded files than it is to compress them. Unfortunately, it takes about as much time.

The compression program writes one-byte codes. Half of each code is a count and the other half is data. To uncompress the data, we just replicate it as many times as the count indicates.

There are some tricks you have to watch out for. First, since there is no such thing as a run of length zero, I replicate the data one more time than the count seems to call for (the compression program uses a count of zero to indicate a run length of zero). Second, since the data is only half a byte long (four bits), the program needs to build bytes out of the data instead of just dropping it into an array.

To try the program, compress a window with `SaveImage` (from last month's article), then run `GetImage`. You might not get back the exact image

Editor's Note: The following procedures will be combined in one source file, `UnPress`*, on this month's RAINBOW ON DISK.*

Listing 1: `GetImage`

```
PROCEDURE GetImage
 0000      DIM FileName:STRING[99]
 000C      INPUT "Image file name: ",FileName
 0025      RUN unpress(FileName)
 002F      END
```

Listing 2: `UnPress`

```
PROCEDURE unpress
 0000      PARAM FileName:STRING[99]
 000C      DIM c:BYTE
 0013      DIM nyble:BYTE
 001A      DIM RunL:BYTE
 0021      DIM Path:BYTE
 0028      DIM buffer(7680):BYTE
 0034      DIM section,i,position:INTEGER
 0043      DIM LeftNyb:BOOLEAN
 004A      DIM WinType,horiz,vert:INTEGER
 0059
 006E      OPEN #Path,FileName:READ
 007A      section:=1
 0081      position:=1
 0088      LeftNyb:=TRUE
 008E      GET #Path,WinType
 0098      GET #Path,horiz
 00A2      GET #Path,vert
```

Peter Dibble has a bachelor's degree in chemistry and is currently a graduate student in computer science. He has worked as an applications programmer, systems programmer and as the user services assistant directory for the University of Rochester Computing Center. With Dale Puckett, he is co-author of The Complete Rainbow Guide to OS-9 *and the first volume of* The Complete Rainbow Guide to OS-9 Level II.

you saved. Since the compression program didn't save the palette, the original color won't be restored. The window type was saved in the disk file, but this program displays in the current window. OS-9 will convert the data to the new window type, but the conversion may not give you just what you expect. If you want more accurate reproduction, it would be easy to alter the `GetImage` program so it sets up a new window with the type from the file.

This decompression program and the compression program that goes with it were designed to compress Color Computer graphics windows. They won't work well for text or for modules. They don't really work very well as stand-alone programs, either. You have to run them in the window that you want to save, and running them messes up the image in the window.

The best way to save screens is by building the compression code into programs that need it. The compression and uncompression programs work on their own standard output path because working with another program's window can be almost impossible. If you want to save images from windows that aren't being used by any other program, you can make a slight modification to compress and use it to save images from any window.

Both the compression and the uncompression programs are too slow. They are good BASIC09 programs, but they just don't run fast enough. This is the time to use assembly language. ☐

```
00AC      WHILE NOT(EOF(#Path)) DO
00B7        GET #Path,c
00C1        RunL:=c/16
00CC        nyble:=LAND(c,$0F)
00D8        GOSUB 100 \REM Put RunL copies of Nyble in the buffer
0105      ENDWHILE
0109      GOSUB 100
010D      CLOSE #Path
0113      END
0115 100  REM Put RunL copies of Nyble in buffer
013D      FOR i:=0 TO RunL
014E        IF LeftNyb THEN
0157          buffer(position):=16*nyble
0166        ELSE
016A          buffer(position):=buffer(position)+nyble
017D          position:=position+1
0188        ENDIF
018A        LeftNyb:=NOT(LeftNyb)
0193        IF position>7680 THEN
01A0          RUN PutBuffer(buffer,section,WinType,horiz,vert/4)
01C0          section:=section+1
01CB          position:=1
01D2        ENDIF
01D4      NEXT i
01DF      RETURN
```

Listing 3: `PutBuffer`

```
PROCEDURE PutBuffer
 0000      PARAM buffer(7680):BYTE
 000C      PARAM section:INTEGER
 0013      PARAM typecode:INTEGER
 001A      PARAM horiz,vert:INTEGER
 0025      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 004A      DIM regs:registers
 0053      DIM i,group:INTEGER
 005E
 005F      REM Get this process's process id
 007F      RUN syscall($0C,regs)
 008D      group:=regs.a
 0098      ON ERROR GOTO 100
 009E      RUN gfx2("defbuff",group,1,7680)
 00B9 100  REM The buffer is now defined
 00D8      RUN gfx2("gpload",group,1,typecode,horiz-1,vert,7680)
 0103      PUT #1,buffer
 010C      RUN gfx2("put",group,1,0,vert*(section-1))
 012D      RUN gfx2("killbuff",group,1)
 0145      END
```

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BARDEN'S BUFFER

From Flatland to 3-D

By William Barden, Jr.
Rainbow Contributing Editor

Holographic video would be great on the CoCo! Can't you imagine the Death Star exploding in space about five inches in front of your CoCo monitor? Better yet, Princess Leia imploring Obi Wan Kenobi to help her? Until that time, however, we're going to have to be content with two dimensions on the screen, like the creatures of Flatland that had only height and width.

Or will we? On reflection I thought it might make an interesting column to see just how difficult it is to implement three dimensions. Although I wouldn't mind a 3-D display of Carrie Fisher, I aimed my sights a little lower — 3-D bar graphs.

3-D Guns and Butter

I'm sure you've seen the type of thing I mean. They're usually displayed in the business section of your local newspaper or *USA Today* and show such things as countries on one axis, the year on another and number of computer systems on still another, as shown in Figure 1.

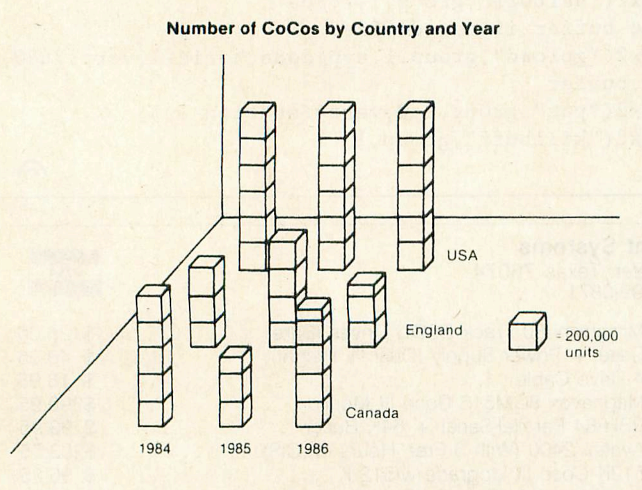

Figure 1: Sample Bar Graph

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects on computers ranging from mainframes to micros.

I thought this would be an easy, short project. As it turned out, it *was* relatively short, but not all that straightforward. There are a lot of things to consider when converting Flatland graphs to three dimensions.

In the following discussion I thought it might be nice to use the powerful 640-by-192, four-color graphics of the CoCo 3. CoCo 2 readers should be able to modify the programs to work in the 256-by-192 mode without a great deal of trouble. We'll talk in terms of Extended Color BASIC and not BASIC09 to keep things simple.

A Graphic Review of Graphs

The CoCo uses an X,Y screen reference in graphics modes. There are 640 pixels in each row, numbered 0 through 639, and 192 pixels in each column, numbered 0 through 191. `HSCREEN 4` sets the 640-by-192 mode, in which four colors can be used. The upper-left corner is pixel 0,0; the upper-right corner is pixel 639,0; the bottom-left corner is pixel 0,191; and the bottom-right corner is pixel 639,191 (see Figure 2).

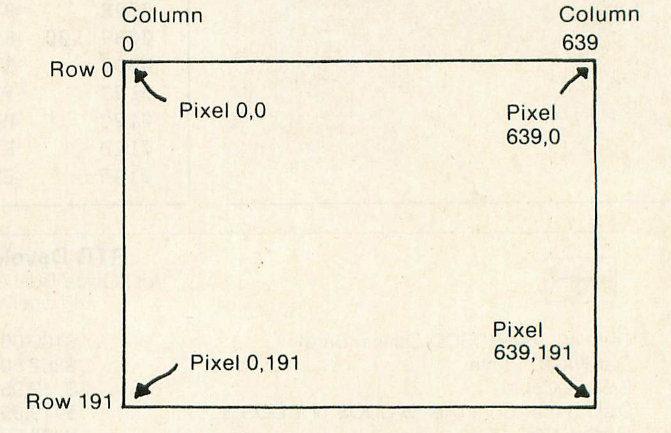

Figure 2: CoCo 3 HSCREEN 4

This is not quite the same as common Cartesian coordinates, in which X increases to the right and Y increases toward the top of the graph, as shown in Figure 3. Cartesian coordinates (named after Rene DesCartes and not Hymie Descartes, as many think) are widely used in mathematics and other applications. Both a positive and negative X and Y region can be shown, and the graph can represent any range of values. The center, or origin, of the graph is usually in the center of the viewing area.

There are two problems right off the bat:

- How can we convert to Cartesian coordinates?
- How can we make the axes (X and Y) represent any range of numbers?

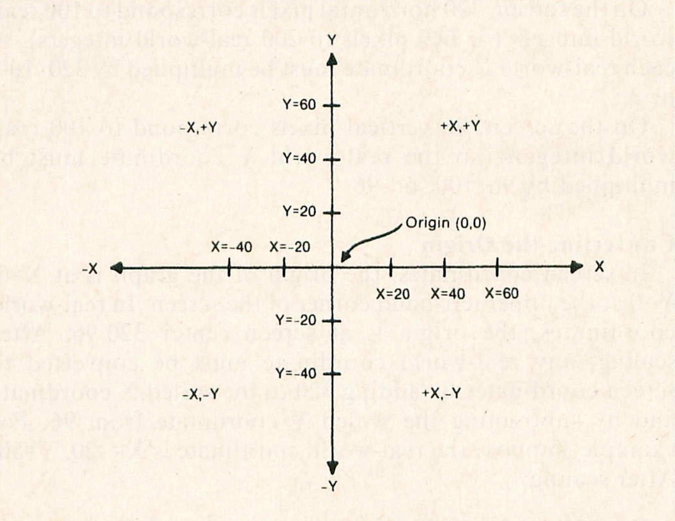

Figure 3: Cartesian Coordinates

Converting to Cartesian Coordinates

Suppose we make the center of the graph at X=320, Y=96. We can draw the X and Y axes by this code:

```
100 HSCREEN 4
110 HCLS
120 HDRAW "BM320, 96; NR319; NU95"
```

The resulting display is shown in Figure 4. `HSCREEN` sets the high resolution screen mode (the `H` prefix is used for all Hi-Res CoCo 3 commands) and `HCLS` clears the screen. The `HDRAW` subcommands move the graphics cursor to 320,96 (near screen center). Draw a line from screen center right 319 pixels to 639,96, and draw a line up 96 pixels to 319,0. The horizontal line is the X axis; the vertical line is the Y axis. The screen center represents X=0, Y=0.

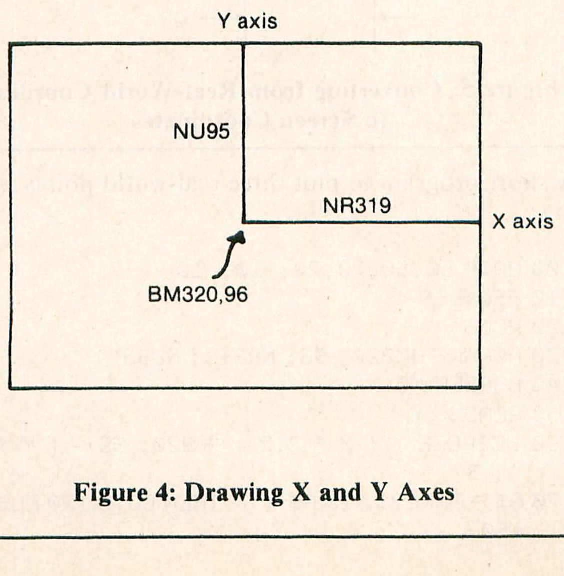

Figure 4: Drawing X and Y Axes

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Scaling

The next problem is to scale the graph. As it stands, the graph can represent points whose X coordinate is 0 through 639 and whose Y coordinate is 0 through *191*. We'd like the graph to represent points with different X and Y ranges. As an example, suppose that we wanted X to be -100 through +100 and Y to be -100 through +100, and in Cartesian coordinates. We'll call these the "real-world" coordinates.

On the screen, 320 horizontal pixels correspond to 100 real-world integers (or 640 pixels to 200 real-world integers), so each real-world X coordinate must be multiplied by 320/100, or 3.2.

On the screen, 96 vertical pixels correspond to 100 real-world integers, so the real-world Y coordinate must be multiplied by 96/100, or .96.

Converting the Origin

In screen coordinates, the origin of the graph is at X=0, Y=0 at the upper left-hand corner of the screen. In real-world coordinates, the origin is at screen center 320,96. After scaling, any real-world coordinate must be converted to screen coordinates by adding 320 to the scaled X coordinate and by subtracting the scaled Y coordinate from 96. For example, suppose the real-world coordinate is X=-20, Y=50. After scaling:

X = -20 * 3.2 = -64
Y = 50 * .96 = +48

Adjusting for the origins:

Xscreen = -64 + 320 = 256
Yscreen = 96 - +48 = 48

The result is shown in Figure 5.

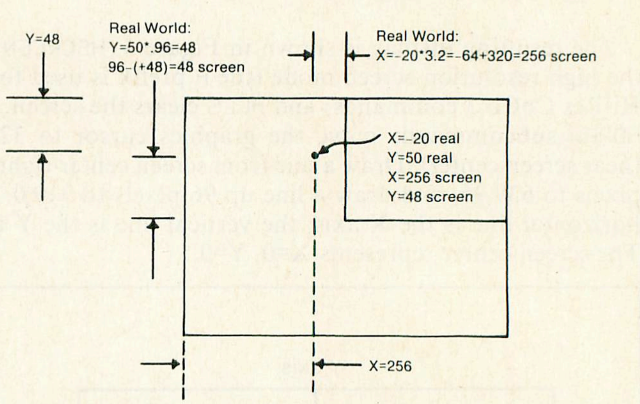

Figure 5: Converting from Real-World Coordinates to Screen Coordinates

A short program to plot three real-world points is shown below:

```
100 DATA 50,50,70,70,-10,-10
110 HSCREEN 4
120 HCLS
130 HDRAW "BM320, 96; NR319; NU95"
140 HSCREEN 0
150 READ X,Y
160 HCIRCLE ( ( X * 3.2 ) = 320, 96 - ( Y * .96 )
    ), 3
170 A$ = INKEY$: IF A$ = "" THEN GOTO 170 ELSE GOTO
    150
```

Another point is plotted when a key is pressed. Each point is plotted as a small circle.

The code scales and converts points in two dimensions. But what about three dimensions?

From Flatland to 3-D

Let's add another axis to the graph above. It's called the Z axis and represents depth. Normally, this axis would appear as a point, because it would be coming out at a perpendicular angle to the screen, as shown in Figure 6.

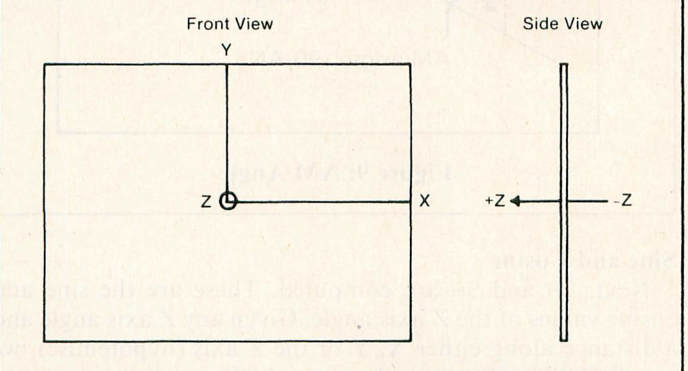

Figure 6: Ideal X,Y,Z Representation

Since we can't really bring out the axis this way (without holography), the Z axis is represented as shown in Figure 7. The axis to the left represents a positive Z value. The missing axis to the right represents negative Z values.

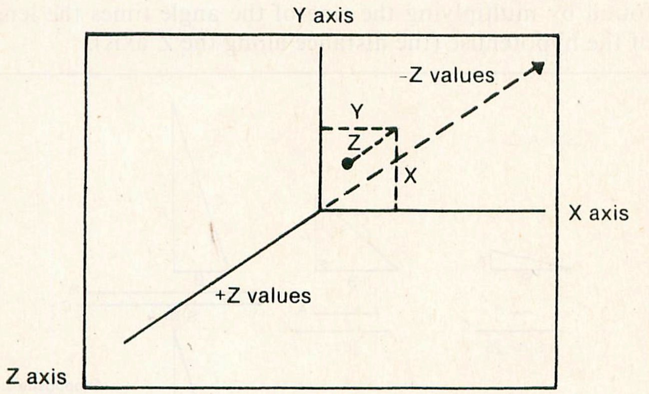

Figure 7: Compromise X,Y,Z Representation

Points are plotted in three dimensions on this graph by first plotting the point in the X and Y dimension and then moving along the Z axis. The greater the Z value, the greater the distance from the origin along Z. A program to plot the point in this fashion is shown in Listing 1. It draws lines representing the intersection of X and Y and then moves out along the Z axis to plot a small circle.

Listing 1:

```
100 ' PLOT POINT IN X,Y,Z
110 INPUT X,Y,Z
120 HSCREEN 4
130 HCLS
140 ' PRELIMINARY AND DRAW AXES
150 AA = 30
160 XS = 100: YS = 100: ZS = 100
170 AN = AA / 57.29583
180 AM = ( 90 - AA ) / 57.29583
190 CA = COS( AN )
200 SA = SIN( AN )
210 HDRAW "BM320,96; NR319 NU96"
220 IF AA <= 45 THEN CX = 0: CY
= 96 * TAN ( AN ) + 96
230 IF AA > 45 THEN CY = 191: CX
 = 320 - TAN( AM ) * 320
240 HLINE ( 320, 96 ) - ( CX, CY
 ), PSET
250 ' LOCATE POINT AND DRAW LINE
S AND POINT
260 X = ( X / XS ) * 320 + 320
270 Y = 96 - ( Y / YS ) * 96
280 XD = -( Z * COS( AN ) / ZS )
 * 320
290 YD = ( Z * SIN( AN ) / ZS )
* 96
300 HLINE ( 320, Y ) - ( X, Y ),
 PSET
310 HLINE ( X, 96 ) - ( X, Y ),
PSET
320 HLINE ( X, Y ) - ( X + XD, Y
 + YD ), PSET
330 HCIRCLE ( X + XD, Y + YD ),
XS/20
340 GOTO 340
```

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Preliminary Code

Suddenly things have gotten more complicated! However, if you can understand this program, you'll understand much of what is involved in drawing shapes in three dimensions.

The X, Y and Z values are first input, the 640-by-192 mode is set, and the Hi-Res screen is cleared.

The next section does all of the preliminary work and draws the axes. Variable AA defines the angle of the Z axis, as shown in Figure 8. This angle could be close to 0 or close to 90 degrees and would represent a different vantage point for the graph with each different angle as shown in the figure. We'll use 30 degrees as the nominal angle.

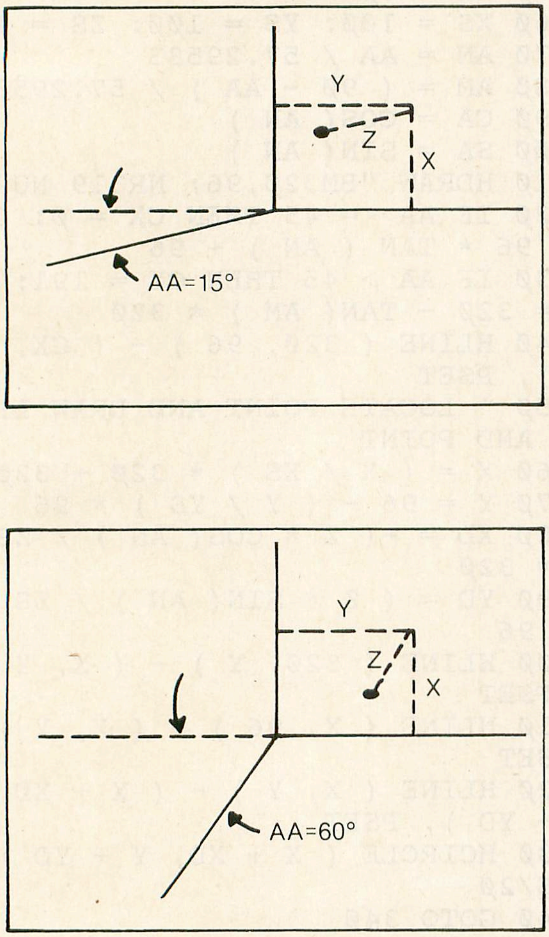

Figure 8: Angle of the Z Axis

Real-World Scaling

Next, variables XS, YS and ZS are set to 100. This represents the real-world scales for each axis. The X axis, for example, represents -100 to +100 in the real-world, with the origin at 0. Next, variable AN is set to the angle of the Z axis in radians. All of the BASIC trigonometric functions work in radians rather than degrees. A radian is an angular measurement like degrees. One radian equals 57.29583 degrees, so dividing the angle by 57.29583 gives the angle of Z in radians.

Next, variable AM is set to the complement of the AN angle. This is the second angle in the triangle formed by the Z axis, as shown in Figure 9.

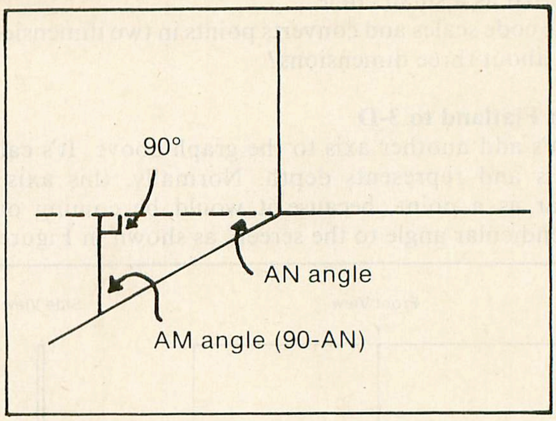

Figure 9: AM Angle

Sine and Cosine

Next, CA and SA are computed. These are the sine and cosine values of the Z axis angle. Given any Z axis angle and a distance along either X, Y or the Z axis (hypotenuse), we can find the other two distances by using sine, cosine or tangent functions.

As a refresher to these functions, look at Figure 10. The sine function is the ratio of the opposite side of the triangle to the hypotenuse. When the angle is small, the opposite side is small and this ratio approaches 0. When the angle approaches 90 degrees, the opposite side is large and the ratio approaches 1. The length of the opposite side (Y) can be found by multiplying the sine of the angle times the length of the hypotenuse (the distance along the Z axis).

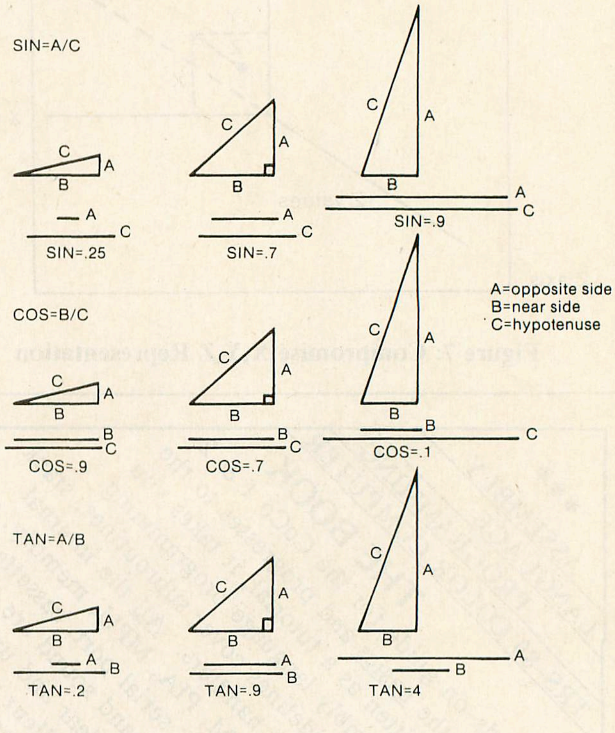

Figure 10: SIN, COS and TAN Functions

The cosine function is the ratio of the near side of the triangle to the hypotenuse. When the angle is small, the near side is large and this ratio approaches 1. When the angle

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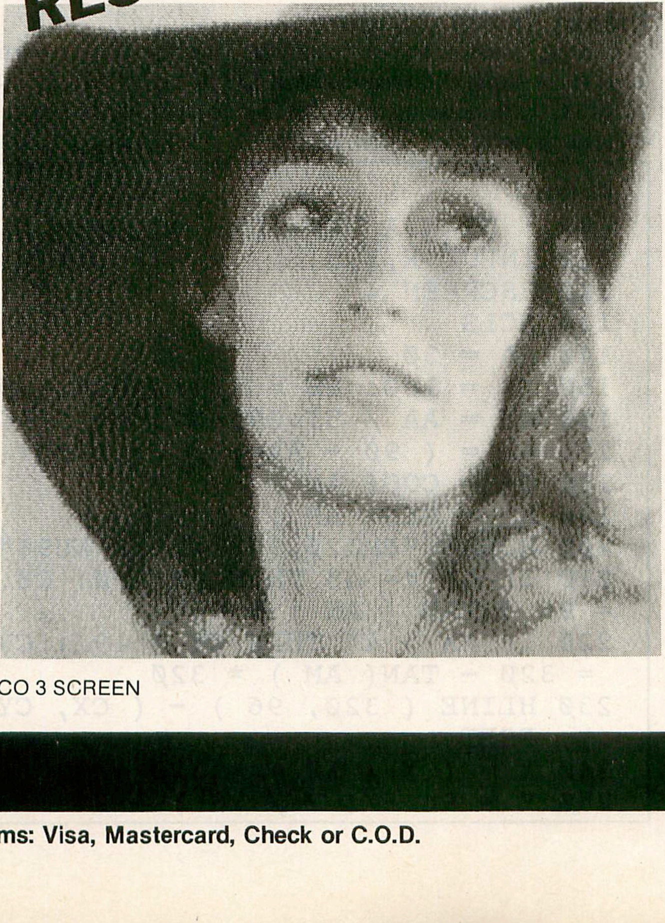

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approaches 90 degrees, the near side is small and the ratio approaches 0. The length of the near side (X) can be found by multiplying the sine of the angle times the length of the hypotenuse (the distance along the Z axis). The sine and cosine, then, vary from 0 to 1 and complement each other — when the sine of the angle is near 0, the cosine is near 1, and vice versa.

The tangent of an angle is the ratio of the opposite side of the triangle to the near side. When the angle is small, this ratio is close to 0, as the opposite side is very small. When the angle approaches 90 degrees, however, the ratio becomes very large (much greater than one), as the opposite side is very large and the near side is very small. At 90 degrees, the opposite side is infinitely large and the near side is infinitely small, making the tangent ratio infinite. Given any angle and one of the two sides, the length of the other side can always be found by using the tangent value of the angle.

Drawing the Axes

Next, the X and Y axes are drawn as before. Now, the Z axis must be drawn. There are really two cases here. If the angle of the Z axis is less than or equal to 45 degrees, the Z axis intersects the left side of the screen. If the angle of the Z axis is greater than 45 degrees, the Z axis intersects the bottom of the screen. A check is made of `AA`, therefore, to see which case applies. If the first case applies, variable `CX` is set to 0 and variable `CY` is set using the tangent function to compute the length of Y. If the second case applies, variable `CY` is set to 191 and variable `CX` is set using the tangent function to compute the length of X. The Z axis is then drawn using the `HLINE` statement in BASIC. These two cases are shown in Figure 11.

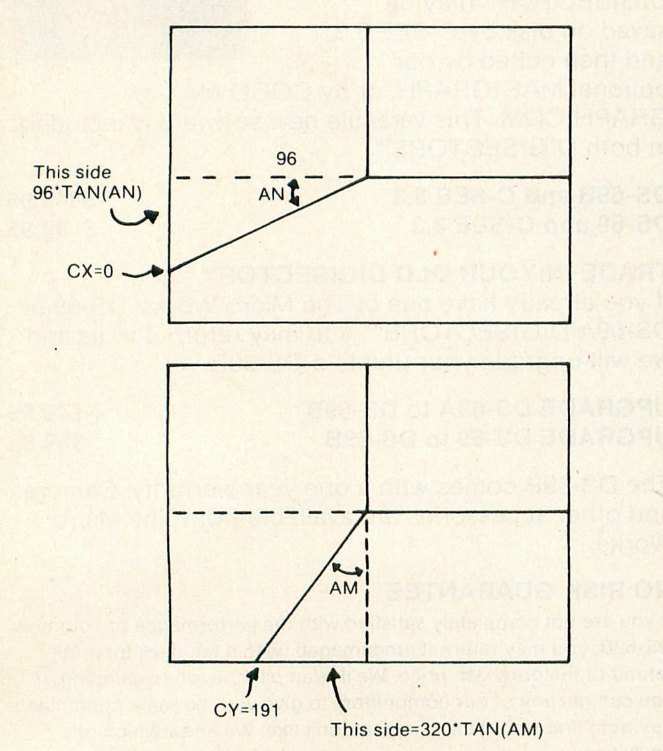

Figure 11: Two Cases for Z Axis

Finding the Point

Next, the distance along X and Y are found. This is a scaling computation similar to what we did before, changing the real-world values of X and Y to screen values.

Two displacements, `XD` and `YD`, are now computed. These represent the displacement along the Z axis to represent the point. The cosine and sine values are used to find `XD` and `YD`. Adding X to `XD` and Y to `YD` gives the screen coordinate of the point in three dimensions.

Now the three locating lines can be drawn by three `LINE` statements. The lines defining X and Y in two dimensions are easy and involve only X and Y values. The line representing the displacement along the Z axis uses the `XD` and `YD` displacements to locate the end of the line. This line end is also used to locate the point and to draw a small circle at its location.

Confused? If so, use the program to change the angle of Z and to draw various points. The final calculations are shown in Figure 12.

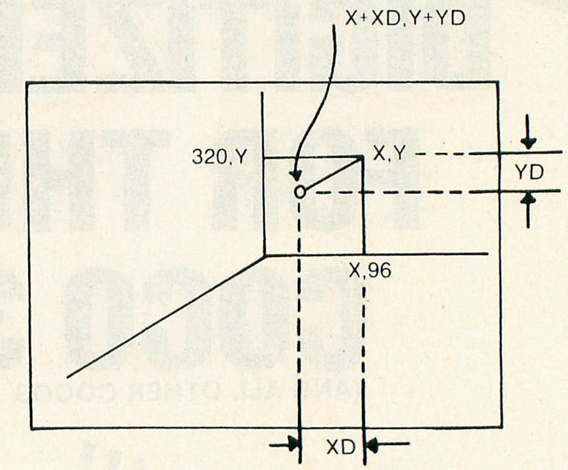

Figure 12: Finding the Point

Drawing Vertical Columns

Listing 2 shows another program. This one draws a vertical column in three dimensions. A 3-D bar graph will be made up of vertical columns, and this is a good exercise before we look at the actual 3-D bar graph.

Listing 2:

```
100 ' DRAW A VERTICAL COLUMN
110 INPUT X,Y,Z
120 HSCREEN 4
130 HCLS
140 AA = 30
150 XS = 100: YS = 100: ZS = 100
160 AN = AA / 57.29583
170 AM = ( 90 - AA ) / 57.29583
180 CA = COS( AN )
190 SA = SIN( AN )
200 HDRAW "BM320,96; NR319 NU96"
210 IF AA <= 45 THEN CX = 0: CY
= 96 * TAN ( AN ) + 96
220 IF AA > 45 THEN CY = 191: CX
 = 320 - TAN( AM ) * 320
230 HLINE ( 320, 96 ) - ( CX, CY
), PSET
240 X = ( X / XS ) * 320 + 320
250 Y = 96 - ( Y / YS ) * 96
```

```
260 XD = -( Z * COS( AN ) / ZS )
  * 320
270 YD = ( Z * SIN( AN ) / ZS )
  * 96
280 HLINE ( X + XD, Y + YD ) - (
  X + XD, Y + YD + Y ), PSET
290 GOTO 290
```

This program is very similar to Listing 1. However, only one line is drawn, the line from X,Y,Z down to the "floor" of the graph — the plane made up of the Z and X axes, as shown in Figure 13.

At this point we could draw a 3-D bar graph by drawing consecutive vertical lines. However, the next program draws a better column than just a straight line.

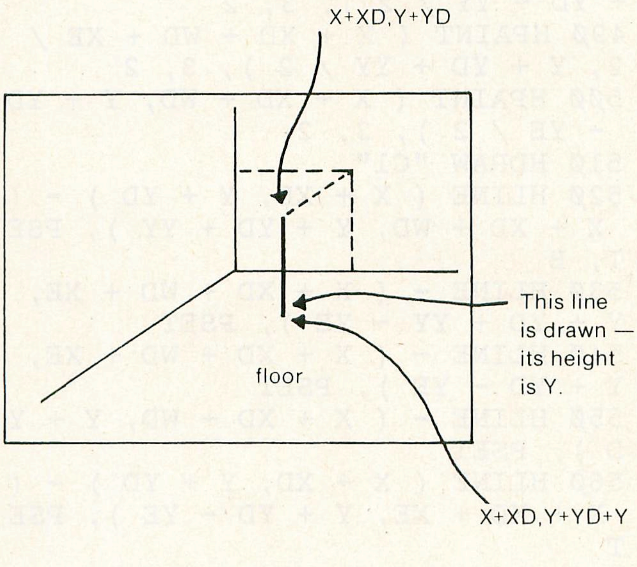

Figure 13: Drawing a Vertical Column

A 3-D Bar Graph Program

OK, ready for the grand finale? Listing 3 shows the 3-D bar graph program. It draws an unlabeled bar graph as shown in Figure 1 with any angle you'd like from 0 to 90 degrees. The bar graph in the figure uses vertical columns with a width and depth for better appearance.

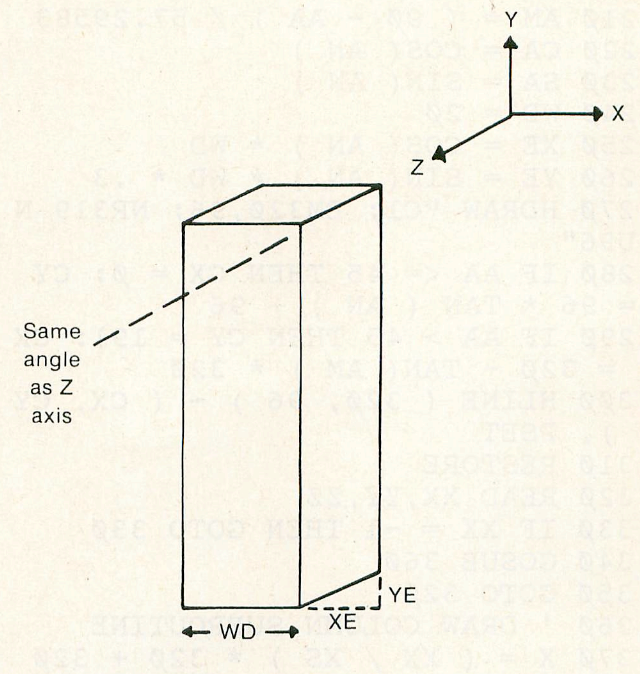

Figure 14: Drawing the Bar Graph Column

Listing 3:

```
100 ' THREE-D BAR GRAPH
110 DATA 20,80,20,40,60,20,60,40
,20,80,20,20
120 DATA 20,60,40,40,40,40,60,20
,40,80,10,40
130 DATA 20,50,60,40,55,60,60,45
,60,80,55,60
140 DATA 20,10,80,40,15,80,60,5,
80,80,5,80
150 DATA -1,-1,-1
160 HSCREEN 4
170 HCLS
180 AA = 35
190 XS = 100: YS = 100: ZS = 100
```

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```
200 AN = AA / 57.29583
210 AM = ( 90 - AA ) / 57.29583
220 CA = COS( AN )
230 SA = SIN( AN )
240 WD = 20
250 XE = COS( AN ) * WD
260 YE = SIN( AN ) * WD * .3
270 HDRAW "C1; BM320,96; NR319 N
U96"
280 IF AA <= 45 THEN CX = 0: CY
= 96 * TAN ( AN ) + 96
290 IF AA > 45 THEN CY = 191: CX
 = 320 - TAN( AM ) * 320
300 HLINE ( 320, 96 ) - ( CX, CY
 ), PSET
310 RESTORE
320 READ XX,YY,ZZ
330 IF XX = -1 THEN GOTO 330
340 GOSUB 360
350 GOTO 320
360 ' DRAW COLUMN SUBROUTINE
370 X = ( XX / XS ) * 320 + 320
380 Y = 96 - ( YY / YS ) * 96
390 XD = -( ZZ * COS( AN ) / ZS
) * 320
400 YD = ( ZZ * SIN( AN ) / ZS )
 * 96
```

```
410 HDRAW "C2"
420 HLINE ( X + XD, Y + YD ) - (
 X + XD + WD, Y + YD + YY ), PSE
T, B
430 HLINE - ( X + XD + WD + XE,
Y + YD + YY - YE ), PSET
440 HLINE - ( X + XD + WD + XE,
Y + YD - YE ), PSET
450 HLINE - ( X + XD + WD, Y + Y
D ), PSET
460 HLINE ( X + XD, Y + YD ) - (
 X + XD + XE, Y + YD - YE ), PSE
T
470 HLINE - ( X + XD + WD + XE,
Y + YD - YE ), PSET
480 HPAINT ( X + XD + WD / 2, Y
+ YD + YY / 2 ), 3, 2
490 HPAINT ( X + XD + WD + XE /
2, Y + YD + YY / 2 ), 3, 2
500 HPAINT ( X + XD + WD, Y + YD
 - YE / 2 ), 3, 2
510 HDRAW "C1"
520 HLINE ( X + XD, Y + YD ) - (
 X + XD + WD, Y + YD + YY ), PSE
T, B
530 HLINE - ( X + XD + WD + XE,
Y + YD + YY - YE ), PSET
540 HLINE - ( X + XD + WD + XE,
Y + YD - YE ), PSET
550 HLINE - ( X + XD + WD, Y + Y
D ), PSET
560 HLINE ( X + XD, Y + YD ) - (
 X + XD + XE, Y + YD - YE ), PSE
T
570 HLINE - ( X + XD + WD + XE,
Y + YD - YE ), PSET
580 RETURN
```

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Preliminary Operations

The data to be plotted is held in DATA statements at the beginning of the program. Each column is represented by three values — X, Y and Z. The height of the column is represented by Y. The DATA values are terminated by X=Y=Z=-1. The DATA values must be arranged so that columns in the back of the graph are drawn first. These columns are overdrawn by other columns. One way to do this is to sort all X,Y,Z data by Z coordinate, putting all larger values of Z later in the DATA statements.

The beginning of the program is very similar to the previous programs, aside from the DATA values. Variable WD is new and defines the width of the column in pixels. We're using 20 pixels for the width here. Variable XE and YE define the displacement of X and Y to draw the sides of the column, as shown in Figure 14. These displacements depend upon the angle of the Z axis, and the sine and cosine functions are used to find them.

The three axes are drawn as in the other program. The program then reads X, Y and Z values from the DATA list, assigning them to XX, YY and ZZ. A Draw Column subroutine is then called to draw the bar graph subroutine. This process continues until the terminating values of -1, -1, -1 are read for `XX`, `YY` and `ZZ`.

Draw Column Subroutine

The Draw Column subroutine is the heart of the *Bar Graph* program. It uses the same basic scheme as Program 2 to draw a vertical column. The subroutine is divided into three parts: drawing the column outline, painting the column and redrawing the column outline.

The graph axis lines are color code 1. The column outline, however, is drawn with color code 2 because color code 2 can now be used as a boundary condition for painting the inside of the column. Each column outline is drawn by six separate `LINE` statements.

The first `LINE` statement draws the front of the column by a line with the "box" option. The `WD` variable is used to define the column width.

The second through sixth `LINE` statements draw the sides and top of the column. Variables `XE`, `YE` and `WD` are used to define the starting and ending points of the lines.

Next, the three areas of the column are painted. There may be an overdrawn axis line (such as the X axis), but as this is color code 1, it is ignored in `PAINT`. Notice that `PAINT` takes care to find a point that is near the center of each area to be painted.

At this point the column is solid color with no outline. The next set of `LINE` statements is the same as the first set, but use a color code of 1, the same as the axes color code. After these `LINE` statements, the column has an outline that is the same color as the axes. This outline is ignored in case the column is later overwritten by another column in the graph.

Using the Bar Graph Plotter

The *Bar Graph Plotter* is not a perfect program. You can blow it up by choosing extreme values for X, Y and Z. It does not have error-checking for out-of-screen coordinates, for example. However, it might make a good basis for your own experiments in three-dimensional plotting. An interesting thing the program does is change the angle of the Z axis to get another view of the graph data. This is especially helpful if some of the columns are hidden by columns in front. Done fast enough, changing the angle of Z gives a three-dimensional rotation effect.

Display labels by using the `HPRINT` statement, which displays text data directly on the Hi-Res screen. The location of the labels is dependent upon the angle of Z, so choose the `AA` angle before labeling the graph.

Change the real-world coordinates by changing `XS`, `YS` and `ZS`. The origin, however, will always be in the center of the screen.

Any number of columns can be used and the width of the columns may be varied. You might, for example, have a continuous strip of columns both across and out from the screen.

Although this wasn't the easiest project in the world, you'll have to admit it is fun to see 3-D bar graphs on the CoCo. It convinced me that more work should be done in this area. I may try Princess Leia next.

See you next month with more CoCo topics.

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KISSable OS-9

Unlock the Graphics Potential of OS-9 Level II

By Dale L. Puckett
Rainbow Contributing Editor

The ability to bootstrap is a wonderful thing. In fact, it's turned an innocent programming example into a lot of fun — and a major project. Hopefully, `KISSDraw` will help you unlock the graphics potential of OS-9 Level II and you'll see how easy it is to develop programs using your CoCo 3.

While Peter Dibble and I were writing *The Complete Rainbow Guide to OS-9 Level II, Volume I: A Beginners Guide to Windows*, we wanted to show you how to use Tandy's optional high resolution mouse. In the meantime, I had been using *MacDraw* for several years and always wondered how to program this kind of magic. I volunteered and `CoCoDraw` was born.

Don't get me wrong, `CoCoDraw` is very primitive. With the version we published in our new book you can only draw boxes, circles and lines. First, you select the object you want to draw from the pull-down menu. Then, you move the pencil to one corner of the area where you would like to draw the object. And finally, you move the pencil pointer to the opposite corner and click the mouse button again.

In a split second, the object you selected from the menu is drawn on the screen. It is contained within the area of an imaginary box you defined by click on two corners.

After completing `CoCoDraw` and the new book, I amused myself for several hours by drawing many different objects using the three graphics tools. Before long, however, it was time to write "KISSable OS-9" for the September issue of RAINBOW. I was so fascinated with `CoCoDraw` that I wanted to enhance it. Before the column was complete, we had added a bar and an ellipse to the toolbox. We also used a new method to address the packet of information from the mouse and changed the way the program worked. We gave it a new name, too — `KISSDraw` was born!

After you selected a tool with `KISSDraw`, you moved the pencil to one corner of the target area and pushed the mouse button. This time, however, you did not release the button or click it. Rather, you held the button down and dragged the pencil across the screen until you reached the opposite corner of the target area. When you released the button, `KISSDraw` went to work and drew the object you had selected.

This method of operation was better, but it still left a lot to be desired. For example, it was hard to imagine what an ellipse placed in the area between the two corners would look like. But, it worked better than the original version where you simply clicked the mouse in the two corners.

And while you were typing in the code, you were learning how to make menus out of overlay windows and how to use them. You were also learning how to pass parameters to OS-9's internals

---

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and coauthor, with Peter Dibble, of* The Complete Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

with the `SysCall` procedure and how to get back and use a packet that contains several dozen pieces of information generated by the mouse plugged into the high resolution adapter.

> ***"Once you have bootstrapped a minimal program, you can use it to build additional parts."***

We played with September's `KISSDraw` for several hours too. We still wanted more! Enter `KISSDraw 2`.

Once you have bootstrapped a minimal program, you can use it to build additional parts. That's the way `KISSDraw` seems to be evolving. During the past month we discovered how to make BASIC09 draw the object we selected in varying sizes as we moved the pencil around on the screen. Each time we move the pencil, the program erases the object it drew at that location and draws another one at the new location.

As you pull the pencil across the screen with the mouse, the box (or whatever you happen to be drawing) expands or contracts before you. When you get it just the size you want it, you release the mouse button and `KISSDraw` finishes the drawing and leaves the object on the screen.

That addition was nifty enough, but we wanted more. We didn't want to have to type a number to select an object

Editor's Note: The following procedures will be combined into one source file, `KISSDraw2`*, on this month's RAINBOW ON DISK.*

Listing 1: `KISSdMenu`

```
0000      (* Procedure to draw 'tools' menu bar on screen
0030
0031      DIM vert:INTEGER
0038      RUN gfx2("pattern",0,0)
004D      RUN gfx2("logic","off")
0060
0061      (* We'll draw an outline of the menu bar first
008F      RUN gfx2("box",10,10,40,178)
00A6
00A7      (* Now we need to fill in the individual boxes
00D5      FOR vert=22 TO 178 STEP 12
00EA        RUN gfx2("line",10,vert,40,vert)
0106      NEXT vert
0111
0112      (* Now we'll add the icons
012C      (* First, an Icon that means 'Draw a Line'
0156
0157      RUN gfx2("line",12,20,38,12)
016F
0170      (* Now an Icon for a Box
0188      RUN gfx2("box",14,24,36,32)
019F
01A0      (* A Circle is our next Icon
01BC      RUN gfx2("circle",25,40,8)
01D3
01D4      (* Now we need an icon for an ellipse
01F9      RUN gfx2("ellipse",25,52,12,3)
0214
0215      (* Now, an icon for a Bar
022E      RUN gfx2("bar",14,61,36,67)
0245
0246      (* An Icon for an Arc is next
0263      RUN gfx2("arc",25,76,7,4,-14,-8,18,14)
0288
0289      (* Now we'll fake a spray can
02A6      RUN gfx2("box",21,86,29,93)
02BD      RUN gfx2("bar",24,84,26,86)
02D4      RUN gfx2("line",26,84,34,82)
02EC      RUN gfx2("line",26,84,38,84)
0304      RUN gfx2("line",26,84,34,85)
031C
031D      (* We'll let the Letter 'T' be an icon
0343      (* to represent typing text
035E      RUN gfx2("curxy",3,12)
0371      PRINT "T";
0377
0378      (* For a freehand icon, we'll use two
039E      (* crossed arcs
03AD      RUN gfx2("arc",20,114,7,4,-14,-8,18,4)
03D2      RUN gfx2("arc",30,110,7,4,14,8,-18,-4)
03F7
03F8      (* Now we'll give you five fill
0417      (* patterns to choose from
0431      (* Large Dots First
0444      RUN gfx2("pattern",204,8)
```

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from a pull-down menu. We thought it would be nicer if we could point to an object, click the mouse button to select a tool, then use that tool to draw the desired object. To do the job, we wrote KISSdMenu.

This month, we present new versions of KISSDrawBox and KISSDrawEllipse. Compare KISSDrawBox to the earlier versions in CoCoDraw and KISSDraw. Compare KISSDrawEllipse to the version we published last month. As you can see, the modifications required to add the "watch while you draw" feature were minimal. Study the differences and file them in your bag of tricks. In fact, you can use them to modify last month's version of KISSDrawLine, KISSDrawCircle and KISSDrawBar.

Notice again the advantages of the bootstrapping process. Once you have a minimal solution running, you can use it to fine-tune future versions. For example, the new versions of KISSDrawBox and KISSDrawEllipse can be run from the KISSDrawObjects menu we published last month. In fact, we used the original menu to test our new procedures.

Our listings this month include KISSDraw2, KISSdMenu, KISSDrawEllipse, KISSDrawBox and KISSFreeHand. Short procedures are included for arc, full and text tools.

Once again, keep in mind that our efforts here are still primitive. We haven't worked out all the details needed to update the menu when it's overwritten, etc. Again we are bootstrapping ourselves into a new and exciting world. There are so many features we want to add and so little time. We need to write a procedure that will let us pick a pattern and fill an area on the screen. Notice, we have already placed the icons for this function on the menu.

We also need to complete a pull-down menu that will pop up in an overlay window when you click the mouse button while pointing to the word file on the menu bar at the top of the screen. On that pull-down menu, we hope you will eventually be able to select commands that let you undo your last act, save your drawing commands to a file while you are working, load a file created earlier, print the screen to your printer, or erase an area of the screen.

Further in the future, it would be nice to add commands that let you change the foreground and background colors — either from a pull-down menu or by clicking on an icon. And ultimately, we

```
0459       RUN gfx2("fill",25,125)
046B       (* Followed by horizontal lines
048A       RUN gfx2("pattern",204,3)
049F       RUN gfx2("fill",25,135)
04B1       (* Now we'll use vertical lines
04D0       RUN gfx2("pattern",204,2)
04E5       RUN gfx2("fill",25,146)
04F7       (* and left slanted lines
0510       RUN gfx2("pattern",204,5)
0525       RUN gfx2("fill",25,156)
0537       (* and finally right slanted lines
0559       RUN gfx2("pattern",204,6)
056E       RUN gfx2("fill",25,172)
0580       (* You must always return to a solid pattern
05AC       (* before you try to draw again
05CB       RUN gfx2("pattern",0,0)
05E0
05E1       (* Now we'll draw a menu bar across the top of the screen
061A       (* Initially, we'll only put a 'file' menu on it.
064B       RUN gfx2("bar",0,0,639,8)
0663       RUN gfx2("curxy",10,0)
0676       RUN gfx2("revon")
0683       PRINT "File ";
068D       RUN gfx2("revoff")
```

Listing 2: KISSDraw2

```
0000       (* Drawing program that lets you select a tool by clicking
003A       (* on an ICON
0047
0048       TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
006D
006E       TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

            INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

            ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

            INTEGER
00DF
00E0       DIM mouse:rodent
00E9       DIM pointer,pencil,line,box,circle,ellipse,bar,arc,fill,text

            ,freehand:BOOLEAN
0118       DIM patterns,horzlines,vertlines,slantright,slantleft,dots:

            BOOLEAN
0133
0134       (* First we need to start with a clear screen
0161       (* and draw the menu
0175
0176       RUN gfx2("clear")
0183       RUN KISSdMenu
0187
0188       (* We must bring the high resolution mouse on line
01BA       (* and find out where it is pointing
01DE
01DF       RUN setupmouse
01E3
01E4       LOOP
01E6
01E7         pointer:=FALSE
01ED         REPEAT
01EF           RUN getKISSmouse(mouse)
01F9
01FA           IF mouse.AcX<40 OR mouse.AcY<10 THEN
0213             pointer:=TRUE
0219           ELSE
021D             pointer:=FALSE
0223           ENDIF
0225
0226           IF pointer THEN
022F             RUN gfx2("gcset",202,1)
0242           ELSE
0246             RUN gfx2("gcset",202,2) \(* A pen to draw with
026E           ENDIF
0270
0271           RUN gfx2("putgc",mouse.AcX,mouse.AcY)
028E         UNTIL mouse.CBSA<>0 AND pointer
02A0
02A1         RUN gfx2("bell") \RUN gfx2("bell")
02B9         GOSUB 10 \REM Go select the proper tool
02D9         GOSUB 20 \REM Go Use It
02E9       ENDLOOP
02ED
```

hope to design a data structure that will let us save each object we draw in memory as we draw it. After we do this, we will be able to select an object so we can edit, duplicate, move, change or delete it.

In this month's offering, the procedure KISSDraw2 is the driving force. It runs KISSdMenu to draw the menu, sets up the mouse and then enters a loop waiting for the user to push the button on the mouse. If the mouse is over the drawing area, the graphics cursor looks like a pencil. If it is over the menu bars, it looks like an arrow or pointer.

As soon as you point to a drawing tool and click the mouse button, KISSDraw calls the proper tool and lets you draw exactly one object. Once that object is drawn, it returns to the loop and waits for you to select another tool. This loop will run forever or until you press BREAK to stop execution of the program. Eventually we'll have to add a quit command to the file menu.

If you would like to contribute anything to this package, get in touch with me at 805 West Edmonston Drive, Rockville, MD 20852. If we all pool our efforts, we could come up with one heck of a drawing program. Let me know what you think.

Presently, KISSdMenu draws the menu "live" when it is called by KISSDraw2. Eventually, we will pack KISSdMenu and run it from the OS-9 shell, redirecting its output to a file. Then, we'll simply use the BASIC09 Shell command to merge that file into our window. After we have done this, our menu will appear on the screen several times faster.

Later on, we'll probably use KISSFreeHand to draw a freehand logo, save it in a buffer and scale it into the menu bar as a new freehand icon. That's another one that will have to wait.

```
02EE 10   (* Subroutine to determine which tool
0316      (* artist wants to draw with
0332
0333      IF mouse.AcY<22 AND mouse.AcY>10 THEN line:=TRUE \ RETURN
0353      ELSE
0357        line:=FALSE
035D      ENDIF
035F
0360      IF mouse.AcY>22 AND mouse.AcY<34 THEN box:=TRUE \ RETURN
0380      ELSE
0384        box:=FALSE
038A      ENDIF
038C
038D      IF mouse.AcY>34 AND mouse.AcY<46 THEN circle:=TRUE \ RETURN

03AD      ELSE
03B1        circle:=FALSE
03B7      ENDIF
03B9
03BA      IF mouse.AcY>46 AND mouse.AcY<58 THEN ellipse:=TRUE \ RETURN

03DA      ELSE
03DE        ellipse:=FALSE
03E4      ENDIF
03E6
03E7      IF mouse.AcY>58 AND mouse.AcY<70 THEN bar:=TRUE \ RETURN
0407      ELSE
040B        bar:=FALSE
0411      ENDIF
0413
0414      IF mouse.AcY>70 AND mouse.AcY<82 THEN arc:=TRUE \ RETURN
0434      ELSE
0438        arc:=FALSE
043E      ENDIF
0440
0441      IF mouse.AcY>82 AND mouse.AcY<94 THEN fill:=TRUE \ RETURN
0461      ELSE
0465        fill:=FALSE
046B      ENDIF
046D
046E      IF mouse.AcY>94 AND mouse.AcY<106 THEN text:=TRUE \ RETURN
048E      ELSE
0492        text:=FALSE
0498      ENDIF
049A
049B      IF mouse.AcY>106 AND mouse.AcY<118 THEN freehand:=TRUE \ RETURN

04BB      ELSE
04BF        freehand:=FALSE
04C5      ENDIF
04C7
04C8      RETURN
04CA
04CB 20   (* Subroutine that runs the proper tool
04F5
04F6      IF line THEN RUN KISSdrawline(mouse) \line:=FALSE \ RETURN
0510      ENDIF
0512
0513      IF box THEN RUN KISSDrawbox(mouse) \box:=FALSE \ RETURN
052D      ENDIF
052F
```

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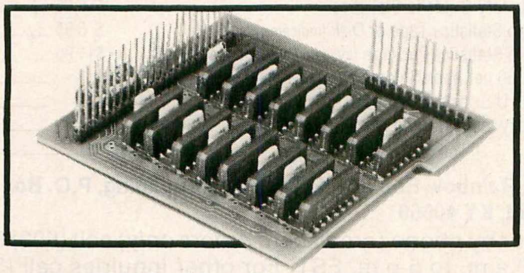

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As you type in the listings this month, you'll notice that these programs use the procedures `SetUpMouse` and `GetKISSMouse`, which we published in September. You'll also need `KISSDrawCircle`, `KISSDrawLine` and `KISSDrawBar` from last month's listings. `KISSDraw2` will run them if you click on the corresponding icon.

You'll probably want to delete the lines that print the instructions on the screen after you know how to use each tool because `KISSDraw2` assumes you know how to use each tool. It does not erase the prompt lines like the procedure `DrawObjects` did.

We run `KISSDraw` in a 640-by-192 pixel, Type 07, four-color window. Before you run them, you will need to merge the `SYS/StdFonts`, `SYS/StdPtrs` and `SYS/StdPats` 4 files into an OS-9 graphics window. We do this in a procedure file we call from `StartUp`.

That's about it for October. Next month, we hope to add more to `KISSDraw`. If you have ideas for `KISSDraw` or even a short procedure to add to it, drop it in the mail. In the meantime, be sure to join us in Princeton, New Jersey, for RAINBOWfest! ☐

```
0530      IF circle THEN RUN KISSDrawCircle(mouse) \circle:=FALSE \ RETURN

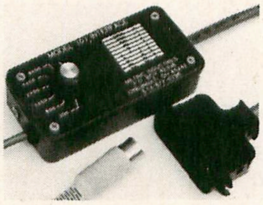
054A      ENDIF
054C
054D      IF ellipse THEN RUN KISSDrawEllipse(mouse) \ellipse:=FALSE \
             RETURN
0567      ENDIF
0569
056A      IF bar THEN RUN KISSDrawBar(mouse) \bar:=FALSE \ RETURN
0584      ENDIF
0586
0587      IF arc THEN RUN KISSDrawArc \arc:=FALSE \ RETURN
059B      ENDIF
059D
059E      IF fill THEN RUN KISSDrawFill \fill:=FALSE \ RETURN
05B2      ENDIF
05B4
05B5      IF text THEN RUN KISSHandleText \text:=FALSE \ RETURN
05C9      ENDIF
05CB
05CC      IF freehand THEN RUN KISSFreehand \freehand:=FALSE \ RETURN


05E0      ENDIF
05E2      RETURN
05E4
```

Listing 3: KISSDrawBar

```
0000      (* Program to draw a bar at location pointed
002C      (* to by high resolution mouse.
004B
004C      (* Uses procedure KISSGetMouse
006A
006B      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
0090
0091      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:
          INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE
```

Model 101 Interface $39.95



- Serial to parallel interface
- Works with any COCO
- Compatible with "Centronics" parallel input printers
- 6 switch selectable baud rates 300-600-1200-2400-4800-9600
- Small size 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

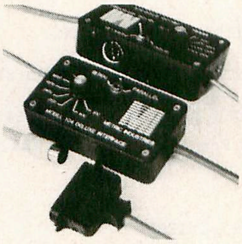
Other Quality Items

High quality 5 screw shell C-10 cassette tapes. **$7.50/dozen**

Hard plastic storage boxes for cassette tapes. **$2.50/dozen**

Pin-Feed Cassette Labels
White **$3.00/100**
Colors **$3.60/100** (specify red, blue, yellow, tan)

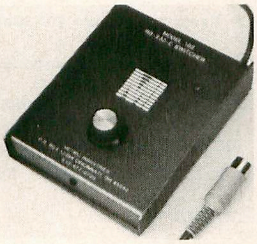
Model 104 Deluxe Interface $51.95



Same features as 101 plus
- Built in serial port for your modem or other serial device
- Switch between parallel output and serial output
- Size is 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

NEW! Cables for your COCO
- U.L. listed foil-shielded cable
- 2 Types: male/female extension cables (used between a serial device and existing cable) male/male cables (used between two serial devices such as a modem and one of our switchers).
- 3 ft./$3.95, 6 ft./$4.49, 10 ft./$5.59 Specify M/M or M/F and length.

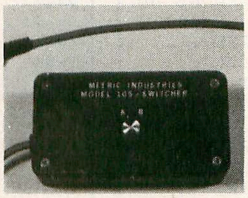
Model 102 Switcher $35.95



- Connect to your COCO serial port and have 3 switch selectable serial ports
- Color coded indicator lights show switch position
- Lights also serve as a *power on* indicator for your COCO
- Heavy guage blue anodized aluminum cabinet with non-slip rubber feet

The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add $5.00 to the price. (Model 101P $44.95, Model 104P $56.95).

Model 105 Switcher $14.95



- Connects to your COCO to give you 2 switch selectable serial ports
- 3 foot cable to connect to your COCO's serial port
- The perfect item to use to connect a printer and a modem to your COCO
- Small in size, only 4.5 x 2.5 x 1.25

The Model 101, 102, 104 and 105 work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Itoh, Seikosha, Panasonic and many others. They support BASIC print commands, word processors and graphic commands.

We manufacture these products - dealer inquiries are invited.

Cassette Label Program $6.95
- New Version - tape transferrable to disk - save and load labels from tape to disk
- Prints 5 lines of information on pin-feed cassette labels
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- Standard, expanded and condensed characters
- Each line of text automatically centered.
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- Program comes on tape and is supplied with 24 labels to get you started
- 16K ECB required

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Call (513) 677-0796 and use your VISA or MASTERCARD or request C.O.D. (Please add $2.00 for C.O.D. orders).
If you prefer, send check or money order; payable in U.S. Funds to:

Metric Industries
P.O. Box 42396
Cincinnati, Ohio
45242

Simple Solutions

By David W. Ostler

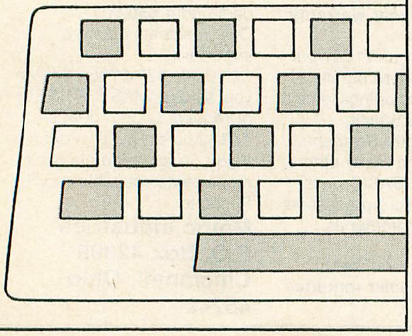
Here are possible answers to the exercises presented in "Basic for Beginners, Lesson 1" (September 1987, Page 26).

Exercise 1

```
10 CLS:A=0:PRINT:PRINT:INPUT"ENT
ER DESIRED NUMBER";A
20 CLS:PRINT:PRINT:PRINT:PRINT"W
ORKING......."
30 B=A*2:FORX=1TO500STEP1:NEXT
40 CLS:PRINT:PRINT:PRINT"
   TOTAL IS:";B
50 PRINT:PRINT:PRINT:PRINT:PRINT
"       HIT ANY KEY TO CONTINUE"
60 A$=INKEY$:IFA$=""THEN60ELSE10
```

Exercise 2

```
10 CLS:PRINT:PRINT"ENTER YOUR NA
ME:  ":INPUTA$
15 PRINT"ENTER YOUR ADDRESS:":IN
PUTB$
20 PRINT"ENTER YOUR CITY":INPUTC
1$
25 PRINT"ENTER YOUR STATE:":INPU
TC2$
30 PRINT"ENTER YOUR ZIP:":INPUTC
3$
40 PRINT"ENTER YOUR TELEPHONE NU
MBER:":INPUTD$
50 CLS:PRINT:PRINT"WORKING......
."
60 FORX=1TO500STEP1:NEXT
70 CLS:PRINT:PRINT"1. YOUR NAME:
":PRINT"   ";A$:PRINT"2. YOUR AD
DRESS:":PRINT"   ";B$:PRINT"3. Y
OUR CITY, ST, ZIP:":PRINT"   ";C
1$;", ";C2$;", ";C3$:PRINT"4. YO
U PH. NO:":PRINT"   ";D$
90 PRINT:PRINT" IS ALL DATA CORR
ECT (Y/N)?"
100 H$=INKEY$:IFH$=""THEN100ELSE
IFH$="Y"THEN110ELSEIFH$="N"THEN1
0ELSE100
110 CLS:PRINT"YOU HAVE SUCCESSFU
LLY DONE THIS PROGRAM. CONGRATUL
ATIONS!!":END
```



```
             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

              INTEGER
0102
0103        DIM Mouse:rodent
010C        DIM StartX,StartY,CurrX,CurrY:INTEGER
011F
0120        (* Let's draw with a pencil cursor
0142
0143        RUN gfx2("gcset",202,2)
0156
0157        (* Enable XOR logic
016B
016C        RUN gfx2("logic","xor")
017F
0180        REPEAT
0182          RUN getKISSmouse(Mouse)
018C          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
01A9        UNTIL Mouse.CBSA<>0
01B7
01B8        StartX:=Mouse.BDX
01C3        StartY:=Mouse.BDY
01CE        CurrX:=Mouse.AcX
01D9        CurrY:=Mouse.BDY
01E4
01E5        RUN gfx2("setdptr",Mouse.BDX,Mouse.BDY)
0204
0205        WHILE Mouse.CBSA<>0 DO
0214          RUN getKISSmouse(Mouse)
021E          IF CurrX<>Mouse.AcX OR CurrY<>Mouse.AcY THEN
0239            RUN gfx2("box",CurrX,CurrY)
024E            CurrX:=Mouse.AcX
0259            CurrY:=Mouse.AcY
0264            RUN gfx2("box",CurrX,CurrY)
0279          ENDIF
027B          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
0298        ENDWHILE
029C
029D        RUN gfx2("logic","off")
02B0
02B1        RUN gfx2("bar",Mouse.AcX,Mouse.AcY)
02CC
02CD        END
02CF
02D0
```

Listing 4: KISSDrawLine

```
0000        (* Program to draw a line at location pointed
002D        (* to by high resolution mouse.
004C
004D        (* Uses procedure KISSGetMouse
006B
006C        TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
0091
0092        TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

              INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE
             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

             INTEGER
0103
0104        DIM StartX,StartY,CurrX,CurrY:INTEGER
0117        DIM Mouse:rodent
0120
0121        (* Let's draw with a pencil cursor
0143
0144        RUN gfx2("gcset",202,2)
0157
0158        RUN gfx2("logic","xor")
016B
016C        REPEAT
016E          RUN getKISSmouse(Mouse)
0178          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
0195        UNTIL Mouse.CBSA<>0
01A3
01A4        StartX:=Mouse.BDX
01AF        StartY:=Mouse.BDY
01BA        CurrX:=Mouse.AcX
01C5        CurrY:=Mouse.AcY
01D0
01D1        RUN gfx2("setdptr",StartX,StartY)
01EA
01EB        WHILE Mouse.CBSA<>0 DO
01FA
01FB          RUN getKISSmouse(Mouse)
0205
0206          IF CurrX<>Mouse.AcX OR CurrY<>Mouse.AcY THEN
0221            RUN gfx2("line",StartX,StartY,CurrX,CurrY)
0241
0242            CurrX:=Mouse.AcX
```

OS9 LEVEL II

SOFTWARE and BOOKS

"Frank Hogg Laboratory has supported OS9 longer than **ANY** other company!!!"

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"Inside OS9 Level II is a gold mine. You'll learn more than you can ever remember about OS-9 system variables, the CoCo's GIMI, the file managers, the windows, the fonts, the descriptors and the bugs. It's a reference work extraordinaire! Buy it!" *said* ***Dale L. Puckett*** *, in the September 1987 Rainbow . Dale is Co-Author of "The Complete Rainbow Guide to OS-9 Level II"*

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The WIZ

By Bill Brady

The Wiz is the **First** and **Only** program designed for the CoCo III that uses **WINDOWS!** The Wiz is a smart terminal and communications program for the CoCo III and OS9 Level II. Making use of multiple windows and overlay windows with pop up dialog boxes The Wiz really shines. Features include: Autolog- lets you configure The Wiz's colors, characters boldface etc., Xmodem and text send and receive, sleep mode, conference mode uses a seperate window for your text, usage log and much more. Does not work with the CoCo's internal bit banger serial port. The complete package includes a special ACIA driver that allows baud rates from 300 to 19,200 baud. Requires the RS232 pak or the Disto RS232 or similar port plus a CoCo III with OS9 Level II and 512K.

Only $79.95

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315/474-7856 Telex 646740 Visa, M/C, Amex, Diners club accepted. Prices do not include shipping.

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing renumeration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

```
024D          CurrY:=Mouse.AcY
0258
0259          RUN gfx2("line",StartX,StartY,CurrX,CurrY)
0279        ENDIF
027B
027C        RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
0299
029A      ENDWHILE
029E
029F      RUN gfx2("logic","off")
02B2      RUN gfx2("line",Mouse.AcX,Mouse.AcY)
02CE
02CF      END
02D1
02D2
```

Listing 5: `KISSDrawCircle`

```
0000      (* Program to draw a circle at location pointed
002F      (* to by high resolution mouse.
004E
004F      (* Uses procedure KISSGetMouse
006D
006E      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
0093
0094      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

           INTEGER
0105
0106      DIM Mouse:rodent
010F      DIM StartX,StartY,CurrX,CurrY:INTEGER
0122
0123      (* We'll use pencil cursor
013E      RUN gfx2("gcset",202,2)
0151
0152      (* Enable XOR logic, then
016B      (* let cursor follow mouse until button is pushed
019C
019D      RUN gfx2("logic","xor")
01B0
01B1      REPEAT
01B3        RUN getKISSmouse(Mouse)
01BD        RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
01DA      UNTIL Mouse.CBSA<>0
01E8
01E9      StartX:=Mouse.BDX
01F4      StartY:=Mouse.BDY
01FF      CurrX:=Mouse.AcX
020A      CurrY:=Mouse.AcY
0215      RUN gfx2("setdptr",StartX,StartY)
022E
022F
0230      WHILE Mouse.CBSA<>0 DO
023F        RUN getKISSmouse(Mouse)
0249        IF CurrX<>Mouse.AcX OR CurrY<>Mouse.AcY THEN
0264          RUN gfx2("circle",ABS(CurrX-StartX))
027B          CurrX:=Mouse.AcX
0286          CurrY:=Mouse.AcY
0291          RUN gfx2("circle",ABS(CurrX-StartX))
02A8        ENDIF
02AA        RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
02C7      ENDWHILE
02CB
02CC      RUN gfx2("logic","off")
02DF
02E0      RUN gfx2("circle",ABS(Mouse.BDX-Mouse.AcX))
02FD
02FE      END
0300
0301
```

Listing 6: `SetUpMouse`

```
0000      (* This procedure uses the program 'SysCall' to
002F      (* do a set status call which sets up OS-9 to treat
0062      (* the Color Computer Mouse as a high resolution device
0099      (* using the right joystick port.  Because, this change is
00D3      (* systemwide, another program using the mouse later would
010D      (* also need to know how to use the optional high
013F      (* resolution mouse adapter.
015B
015C      (* Since this set status call is also used to change the
0194      (* key repeat start constant and delay speed, it tells
01CA      (* OS-9 to leave those parameters unchanged.
01F6
01F7      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
021C
```

```
021D        DIM regs:registers
0226        DIM callcode:BYTE
022D
022E        (* Now set up the mouse parameters
0250
0251        regs.a:=0
025C        regs.b:=$94
0268        regs.x:=$0101
0274        regs.y:=$FFFF
0280        callcode:=$8E
0288
0289        RUN syscall(callcode,regs)
0298
0299        END
029B
029C
```

Listing 7: `GetKISSMouse`

```
0000        (* Reads the present location of the mouse and
002E        (* returns the status of the button.
0052
0053        TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
0078
0079        TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

             INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

             INTEGER
00EA
00EB        DIM RegisterSet:registers
00F4        DIM callcode:BYTE
00FB        PARAM Mouse:rodent
0104
0105        RegisterSet.a:=0
0110        RegisterSet.b:=$89
011C        RegisterSet.x:=ADDR(Mouse)
012A        RegisterSet.y:=1
0135
0136        callcode:=$8D
013E
013F        RUN syscall(callcode,RegisterSet)
014E
014F        END
0151
0152
```

Listing 8: `KISSFreeHand`

```
0000        (* Program to draw freehand with high resolution mouse
0036
0037        (* Uses procedure KISSGetMouse
0055
0056        TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
007B
007C        TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

             INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

             INTEGER
00ED
00EE        DIM Mouse:rodent
00F7        DIM StartX,StartY:INTEGER
0102
0103        (* Let's draw with a pencil cursor
0125
0126        RUN gfx2("gcset",202,2)
0139
013A        (* We must make sure we have turned on the
0164        (* the high resolution mouse
0180
0181        RUN Setupmouse
0185
0186
0187        REPEAT
0189          RUN getKISSMouse(Mouse)
0193          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
01B0        UNTIL Mouse.CBSA<>0
01BE
01BF        StartX:=Mouse.AcX
01CA        StartY:=Mouse.AcY
01D5        RUN gfx2("setdptr",Mouse.BDX,Mouse.BDY)
01F4
01F5        WHILE Mouse.CBSA<>0 DO
0204          RUN getKISSMouse(Mouse)
020E          RUN gfx2("line",StartX,StartY,Mouse.AcX,Mouse.AcY)
```

CoCo Wizard

(This is to the tune of The Who's "Pinball Wizard.")

From Ft. Worth down to Prospect, I thought I'd seen 'em all,
But I ain't seen nothing like it in any shopping mall,
It's brand new from Tandy, it's Commodore's nightmare,
That new little CoCo, sure runs some great software.

I stand like a statue, become part of the machine, Pecking at the keyboard, I'm staring at the screen,
This CoCo's so much fun, it's more than I can bear, That new little CoCo, sure runs some great software.

He's a CoCo Wizard, just watch his fingers fly, A CoCo Wizard will hack until he dies, How do you think it does it — I don't know. What makes it so good?

Can't run *Lotus 1-2-3*, but it burns with *Dynacalc*, And it beats it every time, just ask Lonnie Falk,
That sixty-eight oh nine, no eight bit can compare, That new little CoCo, sure runs some great software.

I thought I was the home computer king, But I just handed my I/O crown to him.

Even on my favorite program, his graphics are the best, I start by typing RUN, the GIME does the rest,
OS-9 gives me more, multi-task if I dare, That new little CoCo, sure runs some neat software.

— Mark E. Sunderlin

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

```
0234          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
0251          StartX:=Mouse.AcX
025C          StartY:=Mouse.AcY
0267        ENDWHILE
026B
026C        END
026E
026F
```

Listing 9: KISSDrawEllipse

```
0000        (* Program which allows more natural drawing of ellipse
0037
0038        TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
005D
005E        TYPE rodent=Vld,Act,ToTm:BYTE; xl:INTEGER; TTTo:BYTE; TSSt:

             INTEGER; cbsa,cbsb,ccta,cctb,ttsa,ttsb,tlsa,tlsb:BYTE

             ; x2,bdx,bdy:INTEGER; stat,res:BYTE; AcX,AcY,WrX,WrY:

             INTEGER
00CF
00D0        DIM Mouse:rodent
00D9        DIM StartX,StartY,CurrX,CurrY:INTEGER
00EC
00ED        (* We'll use pencil cursor
0108        RUN gfx2("gcset",202,2)
011B        RUN setupmouse
011F
0120        (* Enable XOR logic, then
0139        (* let cursor follow mouse until button is pushed
016A
016B        RUN gfx2("logic","xor")
017E
017F        REPEAT
0181          RUN getKISSmouse(Mouse)
018B          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
01A8        UNTIL Mouse.cbsa<>0
01B6
01B7        StartX:=Mouse.bdx
01C2        StartY:=Mouse.bdy
01CD        CurrX:=Mouse.AcX
01D8        CurrY:=Mouse.AcY
01E3        RUN gfx2("setdptr",StartX,StartY)
01FC
01FD
01FE        WHILE Mouse.cbsa<>0 DO
020D          RUN getKISSmouse(Mouse)
0217          IF CurrX<>Mouse.AcX OR CurrY<>Mouse.AcY THEN
0232            RUN gfx2("ellipse",ABS(CurrX-StartX),ABS(CurrY-StartY))


0253            CurrX:=Mouse.AcX
025E            CurrY:=Mouse.AcY
0269            RUN gfx2("ellipse",ABS(CurrX-StartX),ABS(CurrY-StartY))


028A          ENDIF
028C          RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
02A9        ENDWHILE
02AD
02AE        RUN gfx2("logic","off")
02C1        RUN gfx2("ellipse",ABS(Mouse.bdx-Mouse.AcX),ABS(Mouse.bdy-Mouse.AcY

             ))
02EE        RUN gfx2("bell")
02FA        END
02FC
```

Listing 10: KISSDrawBox

```
0000        (* Program to draw a box at location pointed
002C        (* to by high resolution mouse.
004B
004C        (* Uses procedure KISSGetMouse
006A
006B        TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
0090
0091        TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

             INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

             INTEGER
0102
0103        DIM Mouse:rodent
010C        DIM StartX,StartY,CurrX,CurrY:INTEGER
011F
```

```
0120      (* Let's draw with a pencil cursor
0142
0143      RUN gfx2("gcset",202,2)
0156
0157      (* We must make sure we have turned on the
0181      (* the high resolution mouse
019D
019E      RUN Setupmouse
01A2
01A3      (* Enable XOR logic
01B7
01B8      RUN gfx2("logic","xor")
01CB
01CC      REPEAT
01CE        RUN getKISSmouse(Mouse)
01D8        RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
01F5      UNTIL Mouse.CBSA<>0
0203
0204      StartX:=Mouse.BDX
020F      StartY:=Mouse.BDY
021A      CurrX:=Mouse.AcX
0225      CurrY:=Mouse.BDY
0230      RUN gfx2("setdptr",Mouse.BDX,Mouse.BDY)
024F
0250      WHILE Mouse.CBSA<>0 DO
025F        RUN getKISSmouse(Mouse)
0269        IF CurrX<>Mouse.AcX OR CurrY<>Mouse.AcY THEN
0284          RUN gfx2("box",CurrX,CurrY)
0299          CurrX:=Mouse.AcX
02A4          CurrY:=Mouse.AcY
02AF          RUN gfx2("box",CurrX,CurrY)
02C4        ENDIF
02C6        RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
02E3      ENDWHILE
02E7
02E8      RUN gfx2("logic","off")
02FB      RUN gfx2("box",CurrX,CurrY)
0310      RUN gfx2("bell")
031C
031D      END
031F
0320
```

Listing 11: `KISSHandleText`

```
0000      (* Procedure to type text at position
0025      (* selected with graphics cursor
0045
0046      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

           INTEGER
00B7
00B8      DIM Mouse:rodent
00C1      DIM CharPosX,CharPosY:INTEGER
00CC      DIM char:BYTE
00D3
00D4      (* We'll use the veritical bar cursor
00FA      (* that represents a text insert point
0120
0121      RUN gfx2("gcset",202,6)
0134
0135      REPEAT
0137        RUN getKISSmouse(Mouse)
0141        RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
015E      UNTIL Mouse.CBSA<>0
016C
016D      (* Now we must translate the pixel position
0198      (* returned to a character position
01BB
01BC      CharPosX:=Mouse.AcX/8
01CA      CharPosY:=(2+Mouse.AcY)/8
01DB
01DC      (* Now we can position the cursor
01FD
01FE      RUN gfx2("CurXY",CharPosX,CharPosY)
0215
0216      (* Make sure Echo is off
022E      SHELL "tmode -echo"
023D      WHILE char<>13 DO  \REM Carriage Return
025B        GET #0,char
0264        PUT #1,char
026D      ENDWHILE
0271      SHELL "tmode echo"
027F      END
0281
0282
0283
```

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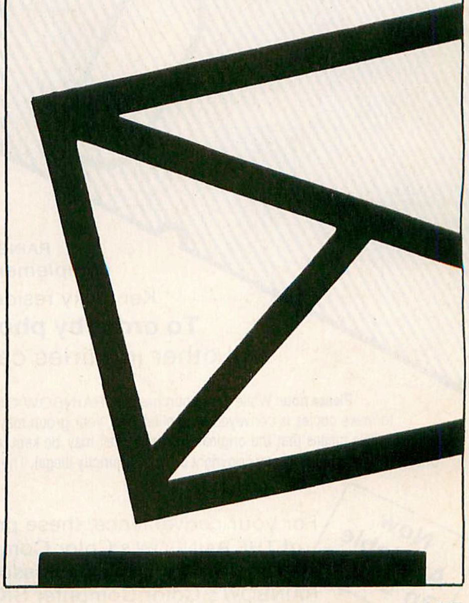

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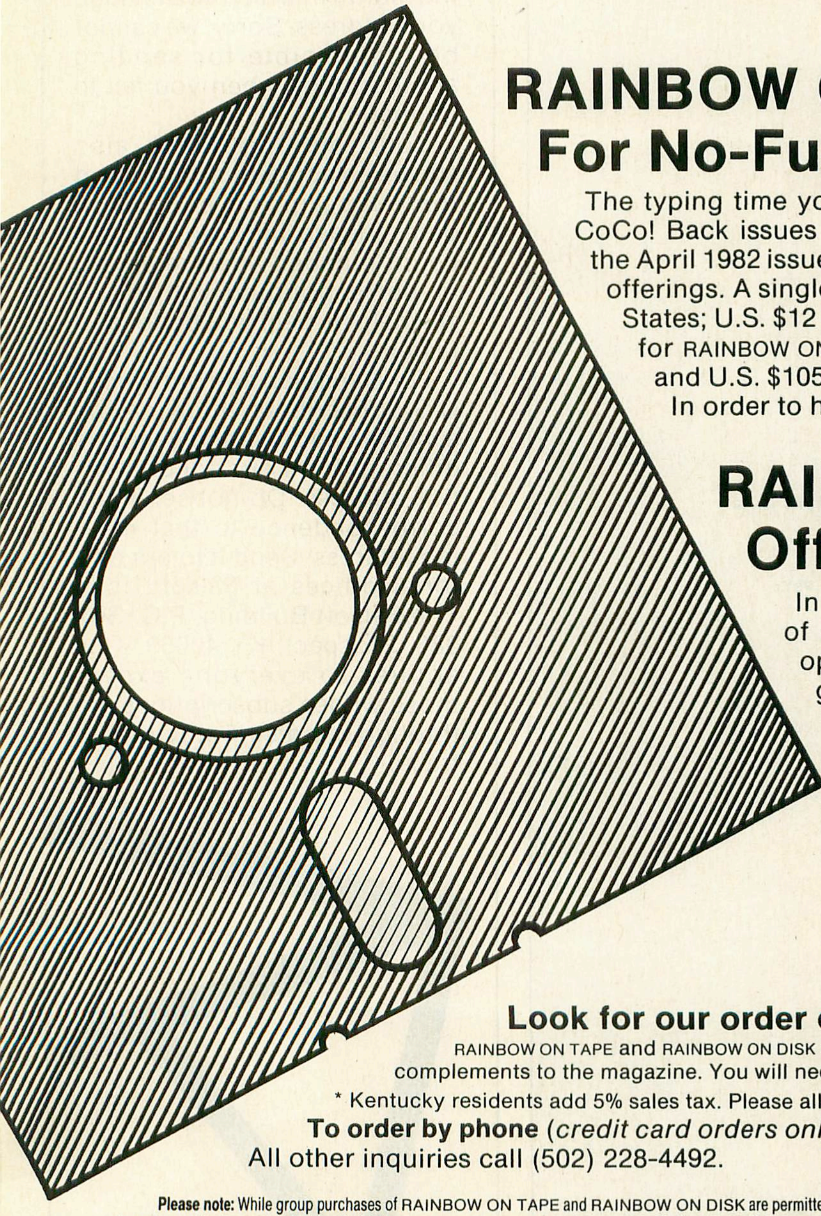

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Listing 12: KISSDrawFill

```
0000       (* Procedure to fill an area of the
0023       (* screen with a pattern selected
0044       (* with the high resolution mouse
0065
0066       TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

            INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

            ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

            INTEGER
00D7
00D8       DIM Mouse:rodent
00E1       DIM pointer,patternset:BOOLEAN
00EC
00ED       patternset:=FALSE
00F3       pointer:=FALSE
00F9
00FA       (* First, we must select the pattern we want to fill with
0133       (* This means we must point to it
0154
0155       WHILE NOT(patternset) DO
015F         REPEAT
0161           RUN getKISSMouse(Mouse)
016B           IF Mouse.AcX<40 THEN  \REM pointer is true
018C             pointer:=TRUE
0192             RUN gfx2("gcset",202,1) \REM pointer icon
01B4           ELSE
01B8             pointer:=FALSE
01BE             RUN gfx2("gcset",202,5) \REM Mark illegal position with icon
01F3           ENDIF
01F5           RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
0212         UNTIL Mouse.CBSA<>0
0220
0221         IF pointer THEN
022A           IF Mouse.AcY>118 AND Mouse.AcY<130 THEN
0243             RUN gfx2("pattern",204,8) \patternset:=TRUE \REM Large Dots
026B           ELSE IF Mouse.AcY>130 AND Mouse.AcY<142 THEN
0287               RUN gfx2("pattern",204,3) \patternset:=TRUE \REM Horizontal lines
02B5             ELSE
02B9               IF Mouse.AcY>142 AND Mouse.AcY<154 THEN
02D2                 RUN gfx2("pattern",204,2) \patternset:=TRUE \REM Vertical lines
02FE               ELSE
0302                 IF Mouse.AcY>154 AND Mouse.AcY<166 THEN
031B                   RUN gfx2("pattern",204,6) \patternset:=TRUE \REM

                        Right Slanted Lines
034C                 ELSE
0350                   IF Mouse.AcY>166 THEN
035F                     RUN gfx2("pattern",204,5) \patternset:=TRUE \REM

                          Left Slanted Lines
038F                   ELSE
0393                     RUN gfx2("pattern",0,0) \REM make sure pattern is solid
03C5                     patternset:=FALSE
03CB                   ENDIF
03CD                 ENDIF
03CF               ENDIF
03D1             ENDIF
03D3           ENDIF
03D5         ENDIF
03D7       ENDWHILE
03DB
03DC       (* We have the pattern now
03F6       (* Let's do actual fill
040D
040E       REPEAT
0410         RUN getKISSMouse(Mouse)
041A
041B         IF Mouse.AcX<40 OR Mouse.AcY<10 THEN
0434           RUN gfx2("goset",202,1) \REM pointer is true
0459         ELSE
045D           RUN gfx2("goset",202,3) \REM Use Cross Hair on drawing screen
0493         ENDIF
0495
0496         RUN gfx2("putgc",Mouse.AcX,Mouse.AcY)
04B3       UNTIL Mouse.CBSA<>0 AND Mouse.AcX>40
04CB
04CC       RUN gfx2("fill",Mouse.AcX,Mouse.AcY)
04E8       RUN gfx2("pattern",0,0) \REM We must always reset to solid pattern
0525       END
0527
```

Listing 13: KISSDrawArc

```
0000       (* To be completed at a later date *)
0025       END
```

Hint . . .

80-Column *EDTASM+*

By now, most people know that Disk *EDTASM+* can be used in the 80-column mode of the Color Computer 3. All you have to do is set up your screen before entering `RUN"DOS"`. However, it is even easier to boot *EDTASM+* in an 80-column mode. Just load the DOS program from disk. You can then edit this BASIC program as you please. Just add a line somewhere near the beginning that sets up the 80-column width and whatever color selections you might want. When finished, just resave the program. Make sure you perform this procedure on a backup and not on your original *EDTASM+* master.

You will still not be able to see what the DOS program displays when you are in the 80-column mode so you will have to remember the keystrokes necessary to execute *EDTASM+*. An easy way to do this is to rename the *EDTASM+* program to something like E. After running DOS, wait for the drives to stop. Then press 2, which will cause DOS to execute a program. The next time the drives stop, just press E and ENTER. That's all there is to it.

Marc Gagnon
Cap-de-la-Madeleine, Quebec

Hint . . .

Changing Color Sets

Now that you've settled in with your CoCo 3, have you ever wondered how to change to the alternate artifact color set without having to hold down F1 and press reset? Here's how you can do it.

If you are at the OK prompt (i.e., if the computer is not presently under control of a program), just enter `POKE &HE033,32`. You will immediately change color sets. To get back to the original set, enter `POKE &HE033,0`.

If you want to change sets from within a program, put `POKE &HFF98,32` at the appropriate point in the program. To return, use `POKE &HFF98,0`. What you are essentially doing in both cases is inverting the burst phase of the video signal.

One more hint: Many programs that prompt you for a color change will continue the moment you press F1, thereby not allowing you to change color sets. The solution is to hold in the reset button, before pressing F1, then press and hold down F1. While holding F1, release the reset button.

Will C. Power
Cotopaxi, CO

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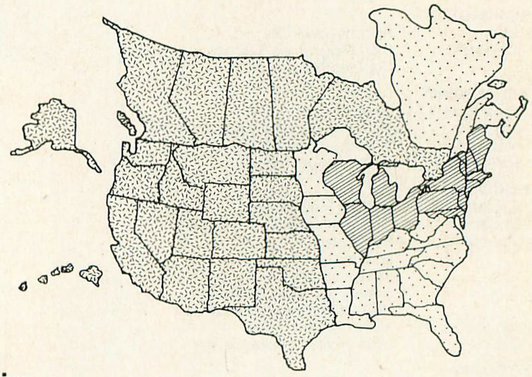

Sugar Software

NEW ☞ OS9 PATCHER ☜ - (C) This is a useful utility for your OS9 Level I or II system. It allows you to modify the contents of a file or memory module using easy to understand commands. Data may be displayed and entered in either decimal, hexadecimal, octal or ascii characters. Module CRCs calculated and patched automatically. Patch command files may be used as input to the Patcher and patch command files can be generated from an original and already patched file. Disk only; OS9 Level I or II; **$19.95**.

CALLIGRAPHER

CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon.* The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95**.

OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIXTM systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9 Level I or II; **$24.95**.

Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #6** - (8 fonts) Block and Computer;

Economy Font Packages on disk; specify RSDOS or OS9; **29.95**: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk. Both Packages #1 and #2 (51 fonts) on one disk; **49.95.** ☜ NEW

NEW ☞ **Calligrapher Combo** Package - *Everything!*; specify RSDOS or OS9; Includes the Calligrapher and both Font Packages on one disk; **$69.95**.

UTILITIES

Piratector - (100% ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes Semigraf. Disk only; CoCo 1, 2, 3 (except Semigraf); **$39.95**.

Super Screen Machine - (100% ML) Put your CoCo into high resolution mode for your own BASIC or ML programs. Smooth scroll, key click, lower case with colored characters. Tape/Disk; 32K CB; CoCo 1, 2, 3 (except 64K mode); **$19.95**.

Color Disk Manager - (100% ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo 1, 2, 3 (except for 64K mode); **$24.95**.

Color Tape Manager - (100% ML) Tape utility with these features: display start, end and exec address of ML programs, convert ML programs into BASIC *DATA* statements, append ML to BASIC, load, display/modify and save tape file, handles missing EOF and filename blocks, much more! Tape/Disk; 16K ECB; CoCo 1, 2, 3 (except for 64K mode); **$19.95**.

INFORMATION MGT.

TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Mail - (Hybrid BASIC/ML) Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Utility - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95** (see combo pkg below).

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95**.

SPORTS STATISTICS

Statistics programs for the coach, team manager or avid fan who wants to keep accurate team and opponent records. Printer output supported. The following are available: Baseball, Basketball, Football and Soccer. Disk only; **$19.95** each.

EDUCATIONAL

NEW ☞ **Trig Attack** - (100% ML) In this educational arcade game, enemy *trigs* travel along math curves. Players learn important mathematical concepts as they play. Trig Attack is filled with sound effects, colorful graphics and features 11 challenging levels. First class mathematical entertainment for ages 9 and up. Excellent manual includes an introduction to trigonometry. Tape 16K CB/Disk 32K ECB; CoCo 1, 2, 3; **$19.95**.

A complete catalog of other sweet Sugar Software products is available.

Silly Syntax - (Hybrid BASIC/ML) Ages 5 and up. Story creation game; output to screen or printer; includes 2 stories or create your own. Tape/Disk; **$19.95** or disk with 62 stories for **$29.95**. Sets of 10 stories on tape/disk for **$4.95**: Fairy Tales, Current Events, X-Rated, Sing-Along, Adventure, Potpourri.

Bible Stories Adventure - (Hybrid BASIC/ML) Ages 4 & up. A graphics adventure game for young children & their families. Old testament. Tape/Disk; **$19.95**.

The Presidents of the USA - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; **$19.95**.

The Great USA - Ages 9 and up. Trivia game of the 50 states. Capitals, nicknames, abbreviations, flowers, trees and birds. Tape/Disk; 16K ECB; **$19.95**.

Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$19.95**.

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level I); Ages 5-7 (level 2); Great graphics and music. Level 1: match colors, shapes, letters and numbers; Level 2: match letters and consonant blends with their sounds. Tape/Disk; Joystick; **$19.95**.

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); Tape/Disk; **$19.95**.

SPECIAL INTEREST

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Radio Systems Design Calculations - Performs 14 different calculations commonly used in design or evaluation of land mobile radio systems, satellite TV, etc. Tape/Disk; **$19.95**.

CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$19.95**.

Flying Tigers - (100% ML) Fast *Defenders* style arcade game. 5 levels of difficulty; Outstanding graphics and sound effects. Tape/Disk; Joystick; **$19.95**.

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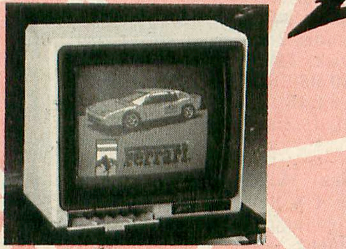

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8 CM 515 has analog RGB for CoCo 3, TTL RGB for Tandy 1000 or IBM PC's, and composite color for CoCo 2 and 3. Built-in speaker. 14" screen with 640 dot × 240 line resolution. Plus 2 years parts and labor warranty.

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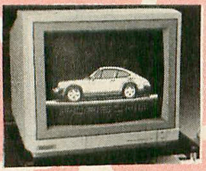

CC-3 Magnavox RGB cable.
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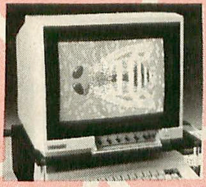
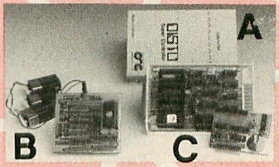


DISK CONTROLLER



Includes controller and C-DOS 4.0 ROM Chip. **DISTO**
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2764 8K Eprom 28 pin **$8 50** each

27128 16K Eprom 28 pin **$8 50** each

C-DOS 3 28 pin Eprom makes Disto controller compatible with CoCo 3 **$20**

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Softlaw's integrated package includes VIP writer terminal, data base, call and disk zap which can fix a diskette that is giving I/O errors

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Howards Drive 0 gives you a DD-3 MPI drive, a CA-1 cable and a J&M DC-4 Disk Controller for only. Double sided double density 360K

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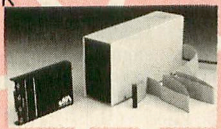

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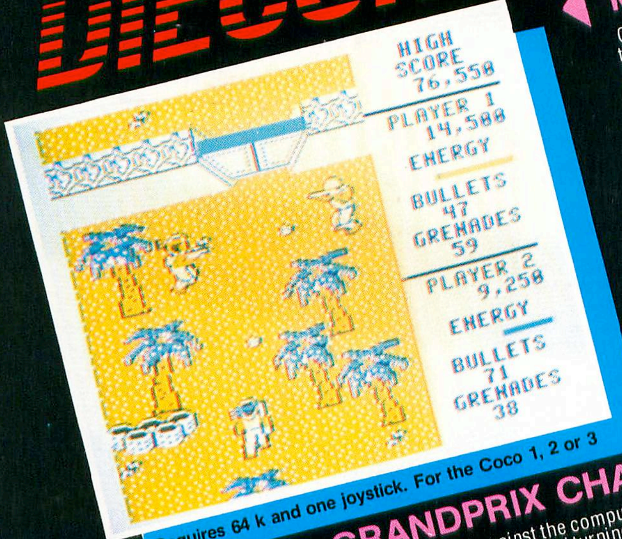

Requires 64 k and one joystick. For the Coco 1, 2 or 3

GRANDPRIX CHALLENGE

Race alone against the computer, or with a friend against the computer in this high speed racing game. You compete in 5 lap races around twisting and turning race courses. Finish the race ahead of all the computer cars and you will progress to a more challenging course. Collect repair tools as you race around the track and you will be able to increase the speed and handling of your race car. But watch out for oil slicks and water puddles on the track or you might find your car crashing into a wall. Detailed 320 × 200 graphics and realistic driving conditions make this a must for your Coco 3 collection. Many different race tracks will keep you challenged.

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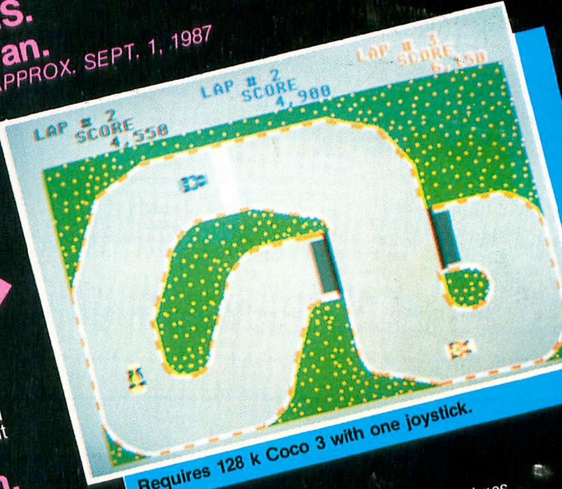

Requires 128 k Coco 3 with one joystick.

GANTELET II

It's back and better than ever. It's Gantelet II for your Coco 3. Using 320 × 200 hi-res graphics with 16 colors, we have created one of the best arcade style games you will ever see for your Coco. Four people can now play simultaneously in one game. Dozens of new levels with new monsters will challenge even the best players. Collect keys to open doors and chests, treasures, and many new magic potions to help you battle more powerful monsters. Watch out for hidden traps as you search for the exit to next level.

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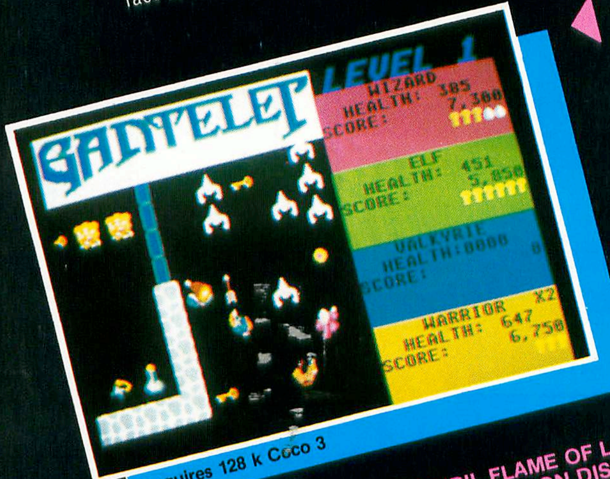

Requires 128 k Coco 3

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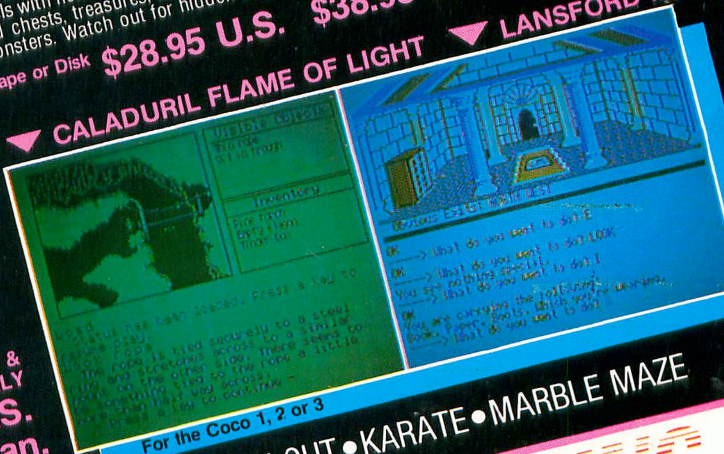

For the Coco 1, 2 or 3

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For your Color Computer 3 !

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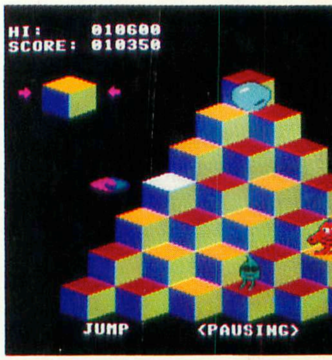

The Pyramid has long been associated with mystery and power. Now, **PYRAMIX**, for your CoCo 3, is a source of endless arcade fun.

PYRAMIX is a 100% machine language game written exclusively to take advantage of all the power in your 128K CoCo 3. The colors are brilliant, the graphics sharp, the action hot.

The object of **PYRAMIX** looks deviously simple. Just change the tops of the blocks in the pyramid to the indicated color. But the accomplishment can be elusive!

Falling boulders, the relentless pursuit of the Snake, the slow moving "death square" and precipitous falls challenge you from all sides. Then there's that little sneak with sunglasses, who undoes your hard-earned color changes if you don't catch him.

It's all quite maddening! As you reach more challenging levels, you'll find that you need to hop on the squares not once but twice in order to change their color. Or, worse yet, hopping on a square you already visited might undo the work you've just done.

But you do have some help in **PYRAMIX.** There are elevator discs. Hop on one and it will take you to the top, possibly luring the greedy Snake over the edge! If you catch a Time-Stopper Orb, time will freeze, allowing uninterrupted work for while.

PYRAMIX features the finest in animation, graphics, sound effects and game play available today. It has all the extras you want, too, such as a pause option, RGB and CMP modes, keyboard or joystick play, help screen, multiple skill level, and the ability to backup your disk.

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Dr. Preble's Prescriptions...

Basic Freedom

Mental Freedom

BASIC FREEDOM! No one wants to be chained down. And yet, if you type in BASIC programs, you have been subject to involuntary servitude! The culprit? BASIC's limited EDIT command.

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For CoCo 1, 2, or 3!

SPECIAL COCO 3 VERSION lets you work in 32, 40, or 80 column display modes. A separate version is available for the CoCo 1 and 2. Available on disk for $29.95 + s/h.

MENTAL FREEDOM by Dr. Preble! IMAGINE! Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, **thought-controlled** graphics: levitation and materialization! **PLUG IN YOUR MIND and UNHOOK YOUR JOYSTICKS**--that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing **Radio Shack Biofeedback Monitor** to bring you **"Mental Freedom."**

For CoCo 2 or 3

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, our Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances. **LIGHTNING FAST** reflexes will do you no good here, unless you first tame the fickle dragon of your mind. **Are you the secretely nervous type?** Many people can keep a "Poker Face" even when they are worried so that others may not notice; but can you really stop the worry itself? Find out with **Mental Freedom!**

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? The voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech, just some clever programming by Dr. Preble.

MENTAL FREEDOM - Next time your friends ask what your computer can do, show them **Dr Preble's Thoughtware!** Requires Radio Shack's Biofeedback Monitor Catalogue #63-675. **Mental Freedom** - TAPE or DISK $29.95 + s/h

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Emboss Grade 1 or Grade 2 Braille using your CoCo 1, 2 or 3 and a Brother Daisy Wheel printer! Fast Print to Braille conversion algorithm converts word processor files, program listings and data files into **touch readable Braille.** For use by the blind or the sighted. **No knowledge of the Braille code is necessary.** Just send print to the program and out comes Braille! Note: The complex Grade 2 conversion is very good and though not always perfect, quite readable. Requires 64K or more. Brother HR series printer or the IF-50 interface series required. Low Cost! Similar software costs 3 times as much. Only $95.

Summer Sale

BASIC FREEDOM	$19.95
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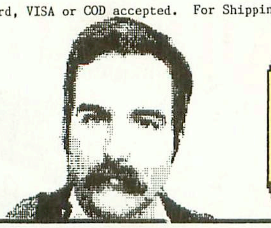

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